



National Transportation Safety Board

Washington, D.C. 20594
Safety Recommendation

2/27

Date: June 4, 1990

In reply refer to: A-90-76 and -77

Honorable James B. Busey
Administrator
Federal Aviation Administration
Washington, D.C. 20591

On November 9, 1988, a Cessna 152, N6578B, crashed shortly after takeoff on runway 10 at the Gainesville Regional Airport, Gainesville, Florida. The pilot and one passenger sustained minor injuries; the airplane was substantially damaged.^{1/}

The pilot of N6578B told Safety Board investigators that he was cleared to taxi to runway 06, where he performed his engine runup. As he was calling the control tower for takeoff clearance, the pilot of a Lockheed Orion P-3 turboprop airplane made a low approach to runway 10. The controller then cleared the Cessna pilot to cross runway 6 and taxi to runway 10 for takeoff. When the Cessna reached runway 10 about 30 seconds later, the controller cleared it for takeoff and cautioned the pilot about wake turbulence from the P-3. As the Cessna pilot taxied onto the runway, he observed the P-3 turning crosswind. The pilot stated that he attempted a short field takeoff in order to climb above any turbulence from the P-3. As the Cessna climbed through 100 feet, the pilot felt some turbulence; the airplane immediately rolled into a 90° right bank. He applied full left aileron control as the airplane descended toward the runway. The airplane recovered to a 20° right bank then hit the runway in a nose-low attitude. The airplane skidded to a stop at the edge of the runway. Visual meteorological conditions existed at the time of the accident; the wind was from 050° at 4 knots.

Under the existing departure separation and wake turbulence criteria, the local controller acted properly and in accordance with procedure. However, the Safety Board believes that current procedures do not take into account the potential hazard of allowing a departure of a small aircraft on a runway from which a pilot has executed a low approach in a large airplane. In addition, the wake turbulence criteria established by the Federal Aviation Administration (FAA) for the air traffic controller are not consistent with the criteria recommended for pilots in the Airman's Information Manual (AIM).

^{1/} Details are given in NTSB Field Accident Report MIA89LA022. Brief number 1744 is attached.

The Safety Board believes that revision to both publications is necessary to establish criteria that are consistent and applicable to those conditions in which a small aircraft may become exposed to wake turbulence from a large airplane.

The separation minima pertaining to wake turbulence, as established by the FAA, are based on the following classifications of airplanes:

Heavy: Aircraft capable of takeoff weights of 300,000 pounds or more whether or not they are operating at this weight during a particular phase of flight.

Large: Aircraft of more than 12,500 pounds, maximum certificated takeoff, up to 300,000 pounds.

Small: Aircraft of 12,500 pounds or less maximum certificated takeoff weight.

In accordance with these criteria, the Cessna 152 was classified as a small airplane and the P-3 was classified as a large airplane.

Procedures to be followed by controllers regarding departure separation and applicable wake turbulence standards are defined in the FAA Air Traffic Control Handbook (7110.65F), paragraph 3-106, "Same Runway Separation." Specifically, subparagraph 106i states:

Separate a small aircraft behind a large aircraft taking off or making a low/missed approach when utilizing opposite direction takeoffs on the same runway by 3 minutes unless a pilot has initiated a request to deviate from the 3-minute interval. In the latter case, issue a wake turbulence advisory before clearing the aircraft for takeoff.

The Safety Board notes that the same handbook also contains a paragraph under 3-107, "Intersection Takeoff," that states:

Separate a small aircraft taking off from an intersection on the same runway (same or opposite direction) behind a preceding departing large aircraft by ensuring that it does not start takeoff roll until at least 3 minutes after the large aircraft has taken off. Inform an aircraft when it is necessary to hold in order to provide the required 3-minute interval.

However, the above minima may be waived under specific conditions which state: "(1) the pilot requests to deviate from the 3-minute interval, (2) the intersection is 500 feet or less from the departure point of the preceding aircraft and both aircraft are taking off in the same direction, and (3) during successive touch-and-go and stop-and-go operations conducted with a small aircraft following a large aircraft in the pattern, provided the pilot of the small aircraft is maintaining visual separation/spacing behind the preceding large aircraft."

If any of these conditions are met, the controller is directed to issue a wake turbulence advisory and issue a clearance for takeoff.

The Safety Board does not believe that current departure separation and wake turbulence criteria, as written, are applicable to the circumstances under which this accident occurred. Further, the FAA's Air Traffic Control Handbook does not require, as it should, a delay for the departure of a small aircraft in the same direction and from the same runway behind a large airplane, the pilot of which has made a low approach, missed approach, or touch-and-go landing.

In addition, FAA Advisory Circular 90-23D, "Aircraft Wake Turbulence," dated December 15, 1972, paragraph 9h, and the Airman's Information Manual, paragraph 545(b)(8), which is advisory to the pilot, state the following:

Departing or landing after a large aircraft executing a low approach, missed approach or touch-and-go landing: Because vortices settle and move laterally near the ground, the vortex hazard may exist along the runway and in your flight path after a large aircraft has executed a low approach, missed approach or a touch-and-go landing, particularly in light quartering wind conditions. You should assure that an interval of at least 2 minutes has elapsed before your takeoff or landing.

The Safety Board does not believe that the interval of delay stated in Advisory Circular 90-23D and the Airman's Information Manual (2 minutes) is consistent with the departure separation and wake turbulence criteria (3 minutes) established for controllers in the Air Traffic Control Handbook for similar situations.

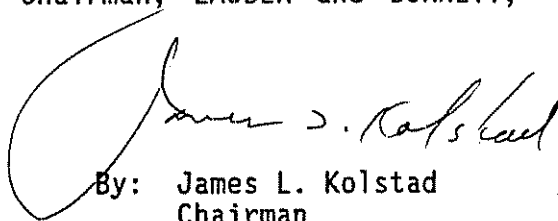
The Safety Board believes that wake turbulence from a large airplane may be present and dangerous for the small airplane when the latter is departing from the same runway in the same or opposite direction. The Air Traffic Control Handbook does require controllers to use 3-minute departure delays under certain conditions in which a small airplane will be departing behind a large airplane using the same runway. The Safety Board believes, therefore, that using this standard, the Air Traffic Control Handbook should be revised to incorporate a 3-minute delay for the small airplane when it is departing behind a large airplane on takeoff or a low or missed approach, regardless of the direction of takeoff.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Amend the Air Traffic Control Handbook, 7110.65F, paragraph 3-106i, to require air traffic controllers to impose a 3-minute delay on the pilots of "small" category airplanes who intend to depart in the same direction from the same runway behind a "large" category airplane that is on takeoff or a low or missed approach, to separate the small airplane from wake turbulence. (Class II, Priority Action)(A-90-76)

Amend the Airman's Information Manual, paragraph 545, and Advisory Circular 90-23D to inform pilots of "small" category aircraft that under certain circumstances involving takeoff behind "large" category aircraft, they can expect that a 3-minute delay will be imposed by air traffic controllers in order to allow for the dissipation of the wake turbulence. (Class II, Priority Action)(A-90-77)

KOLSTAD, Chairman, COUGHLIN, Acting Vice Chairman, LAUBER and BURNETT, Members, concurred in these recommendations.



By: James L. Kolstad
Chairman

Brief of Accident

File No. - 1744 11/09/88 GAINESVILLE, FL A/C Reg. No. N6578R Time (Lcl) - 1652 EST

Basic Information

Type Operating Certificate-NONE (GENERAL AVIATION) Aircraft Damage
SUBSTANTIAL

Type of Operation	-PERSONAL	Fatal	0	Serious	0	Minor	1	None	0
Flight Conducted Under	-14 CFR 91	Crew	0		0		1		0
Accident Occurred During	-TAKEOFF	Pass	0		0		1		0

Aircraft Information

Make/Model - CESSNA 152 End Make/Model - LYCOMING O-235-L2C ELT Installed/Activated - YES/NO
Landing Gear - TRICYCLE-FIXED Number Engines - 1 Stall Warning System - YES
Max Gross Wt - 1670 Engine Type - RECIPROCATING-CARBURETOR
No. of Seats - 2 Rated Power - 110 HP

Environment/Operations Information

Weather Data
WX Briefing - NO RECORD OF BRIEFING
Method - N/A
Completeness - N/A
Basic Weather - VMC
Wind Dir/Speed - 050/004 KTS
Visibility - 10.0 SM
Lowest Sky/CLOUDS - 25000 FT THIN BKN
Lowest Ceiling - NONE
Obstructions to Vision - NONE
Precipitation - NONE
Condition of Light - DAYLIGHT

Personnel Information

Pilot-In-Command
Certificate(s)/Rating(s)
PRIVATE
SE LAND

Itinerary

Last Departure Point
SAME AS ACC/INC
Destination
LOCAL

ATC/Airspace
Type of Flight Plan - NONE
Type of Clearance - VFR
Type Apch/Lndg - NONE

Airport Proximity
ON AIRPORT

Airport Data
GAINESVILLE REGIONAL
Runway Ident - 10
Runway Lth/Wid - 7500/ 150
Runway Surface - ASPHALT
Runway Status - DRY

Age - 21 Medical Certificate - VALID MEDICAL-NO WAIVERS/LIMIT
Biennial Flight Review Flight Time (Hours)
Current - YES Total - 80 Last 24 Hrs - 0
Months Since - 2 Make/Model - 76 Last 30 Days - 30
Aircraft Type - C-152 Instrument - 0 Last 90 Days - 70

Instrument Rating(s) - NONE

Narrative

THE FLT TAXIED TO RWY 6 & MADE AN ENG RUN-UP. AS HE CALLED THE TWR FOR TKOF, A NAVY P-3 WAS MAKING A LOW APCH TO RWY 10. THE FLT WAS TOLD TO TAXI TO RWY 10. ABT 30 SEC LATER, AS HE ARRIVED AT RWY 10, HE WAS CLRD FOR TKOF & WAS CAUTIONED ABT WAKE TURBC FM THE P-3. THE FLT TKOF ON RWY 10 & MNVRD TO AVOID WAKE TURBC. AS THE ACFT WAS CLIMBING THRU ABT 100', IT ROLLED VIOLENTLY TO THE RGT. THE FLT APPLIED CORRECTIVE ACTION, BUT THE ACFT DSCND & HIT THE RWY BFR HE COULD RCVR. THE AIM & FAA ADZY CIRCULAR 90-23D WARNED OF WAKE TURBC & RCMD 2 MIN INTERVAL WHEN SMALL ACFT IS DEPG BHD A LARGE ACFT. THE TWR CLR COMPLIED WITH APPLICABLE ATC DIRECTIVES. PARAGRAPH 3-106I OF ATC HANDBOOK 7110.65F SAID TO 'SEPARATE A SMALL ACFT BHD A LARGE ACFT TAKING OFF OR MAKING A LOW/MISSED APCH WHEN UTILIZING OPPOSITE DRCTN TAKEOFFS ON THE SAME RWY BY 3 MIN UNLESS A FLT HAS INITIATED A REQUEST TO DEVIATE FM THE 3 MIN INTERVAL. IN THE LATTER CASE, ISSUE A WAKE TURBC ADZY BEFORE CLRG THE ACFT FOR TAKEOFF.' HOWEVER, THE HANDBOOK DID NOT ADDRESS TAKEOFFS BHD SAME DRCTN LOW APCHS.

Brief of Accident (Continued)

File No. - 1744 11/09/88 GAINESVILLE, FL A/C Reg. No. N6578B Time (Lcl) - 1652 EST

Occurrence #1 VORTEX TURBULENCE ENCOUNTERED
Phase of Operation TAKEOFF - INITIAL CLIMB

Findings(s)

1. ATC CLEARANCE PROCEDURE - INADEQUATE
2. TRAFFIC ADVISORY - ISSUED - ATC PSNL(LCL/GND/CLNC)
3. PLANNING-DECISION - IMPROPER - PILOT IN COMMAND

Occurrence #2 LOSS OF CONTROL - IN FLIGHT
Phase of Operation TAKEOFF - INITIAL CLIMB

Findings(s)

4. AIRCRAFT CONTROL - NOT POSSIBLE -

Occurrence #3 IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation DESCENT - UNCONTROLLED

-----Probable Cause-----

The National Transportation Safety Board determines that the Probable Cause(s) of this accident is/are finding(s) 3

Factor(s) relating to this accident is/are findings(s) 1