

209 1795



National Transportation Safety Board

Washington, D.C. 20594
Safety Recommendation

Date: September 17, 1986

In reply refer to: A-86-95 and -96

Honorable Donald D. Engen
Administrator
Federal Aviation Administration
Washington, D. C. 20591

On March 23, 1985, a Swearingen Model SA226TC Metro, N508SS, operated by Air Midwest Skyways, Inc., crashed at Hot Springs, Arkansas, while landing at the Hot Springs Memorial Airport. The scheduled domestic commuter flight, operating as Skyways Flight 221, had a crew of two airline transport rated pilots and seven passengers aboard. The airplane was substantially damaged as a result of landing with its landing gear retracted; no occupants were injured. The Safety Board's investigation of the accident disclosed that the landing gear was inadvertently retracted when the captain bumped the gear selector lever to the gear up position with his hand during the landing flare. An examination of the gear selector mechanism following the accident revealed that it was not worn and had functioned properly. Consequently, the Safety Board determined that the location and design of the gear selector lever was inadequate.

Since 1969 the Safety Board has investigated six other accidents involving Swearingen SA26 and SA226 airplanes in which the inadvertent activation of the landing gear selector lever resulted in unwanted landing gear retraction. On February 24, 1979, a Swearingen Model SA26AT, N211CC, operated by C. J. Aviation, Inc., crashed during a corporate training flight at DuPage Airport in West Chicago, Illinois. Prior to departure on the flight, the instructor pilot exited the aircraft, briefly examined an engine for a mechanical problem, and returned to the right cockpit seat. During the subsequent takeoff run, the landing gear retracted prematurely and the airplane crashed, causing substantial damage. The Safety Board believes that the gear selector lever was inadvertently bumped to the gear-up position by the instructor pilot while moving from or returning to his seat.

On January 29, 1984, a Swearingen Model SA226T, N99JW, crashed and was substantially damaged during the landing phase of a business flight at Philadelphia International Airport, Philadelphia, Pennsylvania. The airline transport rated pilot reported that a young passenger seated in the copilot's seat may have inadvertently bumped the landing gear selector lever during the landing flare, causing gear retraction and a gear-up landing.

4457/860-3

On January 24, 1985, a Swearingen SA26T, N600P, crashed and suffered total loss damage as a result of premature landing gear retraction during takeoff on a business flight from Love Field, Dallas, Texas. The accident investigation revealed that the landing gear selector lever could easily be moved through its full range of travel, and that the detent mechanism was ineffective. Additionally, the arm of the pilot's seat lightly touched the gear selector lever when the seat was in the full forward position, as it was at the time of this accident. The cause of the gear retraction was officially undetermined, although inadvertent activation of the gear selector lever is highly suspect.

The landing gear selector lever in Swearingen Model SA26 and SA226 airplanes is located on the left front side of the center pedestal, below the throttle controls, between and in close proximity to the pilots' seats. The gear selector lever protrudes out of the pedestal approximately 2 inches, about 12 inches above the cockpit floor, and is susceptible to contact while moving to or from the seats. No positive locking device is incorporated into the design of the landing gear selector lever.

Swearingen Model SA26T, SA26AT, SA226T, and SA226AT airplanes are certificated under Part 3 of the Civil Air Regulations.

Subpart D, Section 3.384(a) states:

All cockpit controls shall be so located and, except for those the function of which is obvious, identified as to provide convenience in operation including provisions to prevent the possibility of confusion and consequent inadvertent operation.

Swearingen Model SA226TC airplanes are certificated under Part 23 of the Federal Aviation Regulations.

Subpart D, Section 23.777(a) states:

Each cockpit control must be located and (except where its function is obvious) identified to provide convenient operation and to prevent confusion and inadvertent operation.

There were, as of December 31, 1984, a total of approximately 270 Swearingen Model SA26 and SA226 airplanes registered in the United States and it is estimated that there are more than 600 of these airplanes in operation throughout the world.

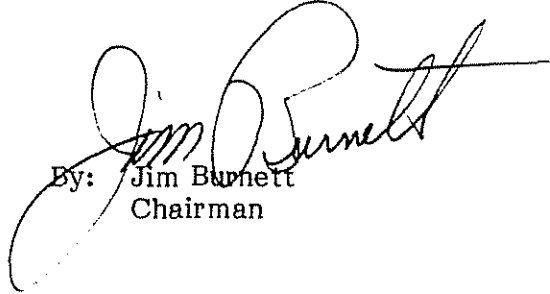
In consideration of the potential hazards involving unwanted and inadvertent landing gear retraction, the Safety Board believes that the Federal Aviation Administration should undertake a human engineering evaluation of the location and design of Swearingen Model SA26 and SA226 landing gear selector levers identify appropriate remedial action to eliminate these inadvertent activation hazards, and require modification of these airplanes accordingly.

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

Evaluate the location and design of the landing gear selector lever in Swearingen Model SA26 and SA226 airplanes and identify the remedial action necessary to eliminate the potential hazard of inadvertent landing gear selector lever operation in these airplanes. (Class II, Priority Action) (A-86-95)

Issue an Airworthiness Directive requiring the modification of Swearingen Model SA26 and SA226 airplanes to eliminate the potential hazard of inadvertent landing gear selector lever operation in these airplanes. (Class II, Priority Action) (A-86-96)

BURNETT, Chairman, GOLDMAN, Vice Chairman, and LAUBER and NALL, Members, concurred in these recommendations.


By: Jim Burnett
Chairman

National Transportation Safety Board
Washington D.C. 20594

Brief of Accident

File No. - 197 3/23/85 HOT SPRINGS, AR A/C Reg. No. N508SS Time (Local) - 1045 CST

---Basic Information---
 Type Operating Certificate - COMMUTER
 Name of Carrier - ALK MIDWEST SKYWAYS, INC.
 Type of Operation - SCHEDULED, DOMESTIC, PASSENGER
 Flight Conducted Under - 14 CFR 135
 Accident Occurred During - LANDING
 Aircraft Damage
 Fatal Serious Minor Injuries None
 0 0 0 0 2
 Crew Pass
 0 0 0 0 7

---Aircraft Information---
 Make/Model - SWEARINGEN SA226TC ELT Installed/Activated - YES/NO
 Landing Gear - RECYCLE-RETRACTABLE Stall Warning System - YES
 Max Gross Wt - 12500
 No. of Seats - 19
 End Make/Model - GARRETT TP331 SERIES
 Number Engines - 2
 Engine Type - TURBOPROP
 Rated Power - 840 HP

---Environment/Operations Information---
 Weather Data
 Wx Briefing - UNK/NR
 Method - UNK/NR
 Completeness - UNK/NR
 Basic Weather - VMC
 Wind Dir/Speed - 310/007 KTS
 Visibility - 7.0 SM
 Lowest Sky/Clouds - UNK/NR
 Lowest Ceiling - 4000 FT BROKEN
 Obstructions to Vision - NONE
 Precipitation - NONE
 Condition of Light - DAYLIGHT
 Itinerary
 Last Departure Point - LITTLE ROCK, AR
 Destination - SAME AS ACC/INC
 ATC/Airspace
 Type of Flight Plan - IFR
 Type of Clearance - IFR
 Type Appch/Lndg - LDA
 TRAFFIC PATTERN
 Airport Proximity
 ON AIRPORT
 Airport Data
 HOT SPRING MEM - 23
 Runway Lth/Wid - 6600/ 150
 Runway Surface - ASPHALT
 Runway Status - DRY

---Personnel Information---
 Pilot-In-Command
 Certificate(s)/Rating(s)
 ATP
 SE LAND
 Age - 28
 Annual Flight Review - YES
 Current Months Since - 4
 Aircraft Type - SA226TC
 Medical Certificate - VALID MEDICAL-NO WAIVERS/LIMIT
 Flight Time (Hours)
 Total - 3032
 Make/Model - 1280
 Instrument - 255
 Multi-Eng - 1530
 Last 24 Hrs - 6
 Last 30 Days - UNK/NR
 Last 90 Days - 150

Instrument Rating(s) - AIRPLANE
 ---Narration---
 THE FIRST OFFICER WAS MAKING THE LANDING AND THE ACFT BOUNCED DURING TOUCHDOWN. THE CAPTAIN'S RIGHT HAND, WHICH HAD BEEN NEAR THE FLOOR TO THE RIGHT OF HIS SEAT, BUMPED THE LANDING GEAR SELECTOR TO THE UP POSITION AS THE CAPTAIN REACHED FOR THE YOKE. THE AIRCRAFT THEN LANDED WITH THE GEAR RETRACTED, ALTHOUGH THE LANDING GEAR SELECTOR HANDLE LATCH MECHANISM OPERATED AS DESIGNED. TESTS SHOWED THE MECHANISM OFFERED LITTLE RESISTANCE TO INADVERTENT MOVEMENT TO THE UP POSITION.

Brief of Accident (Continued)

File No. 197 3/23/85 HOT SPRINGS, AR A/C Reg. No. N50855 Time (Lcl) - 1045 CST

Occurrence COMPLETE GEAR COLLAPSED
Phase of Operation LANDING - FLARE/TOUCHDOWN

- Findings(s)
1. FLARE - INADEQUATE - COPILOT
 2. LANDING GEAR, GEAR SWITCH - INADEQUATE
 3. AIRCRAFT/EQUIPMENT, INADEQUATE DESIGN - PRODUCTION/DESIGN PSNL
 4. GEAR RETRACTION - INADVERTENT - PILOT IN COMMAND

---Probable Cause---

The National Transportation Safety Board determines that the Probable Cause(s) of this accident is/are finding(s) 4

Factor(s) relating to this accident is/are findings(s) 2,3

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D. C. 20548

BRIEF OF AVIATION ACCIDENT

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURED	FLIGHT PURPOSE	PILOT DATA
3-0510	2/24/79	WEST CHICAGO, IL	SWENRUDER SA26T MELICC PROOF-SUBSTANTIAL	DE- 0 0 0 FX- 0 0 0	INSTRUCTORIAL LOCAL	AIP, FLIGHT INSTR., AGE 32, 6880 TOTAL HOURS, 373 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - WOODS COUNTY
 DEPARTURE POINT - INTENDED DESTINATION
 WEST CHICAGO, IL LOCAL

PHASE OF OPERATION
 TAKEOFF; RUN

PROBABLE CAUSE(S)
 PILOT IN COMMAND - INADEQUATE SUPERVISION OF FLIGHT
 RUNG STUBENT - INSUBQUENTLY RETRACTED GEAR

National Transportation Safety Board
Washington, D.C. 20594

Enter of Accident

Date: 1/29/84 File No: PHILADELPHIA AC Res. No: N79JM Time (UTC) - 1800 EST

Operator: Continental Airlines (GENERAL AVIATION) Aircraft: Boeing 737-400
 Type of Operation: - BUSINESS Injuries: Fatal 0 Minor 0 None 0
 Flight Conducted Under: - 14 CFR 91 Crew Pass 0
 Location: Philadelphia - Landing

Registration: N11111
 Make/Model: Emb. Model - D9E TR-737
 Landing Gear: - SWARINGEN SG-22AT Number Engines: 2
 Max Gross Wt: - 12500 Engine Type: - TURBOPROP
 No. of Seats: 2 Rated Power: - 504 HP

ELT Installed/Activated - YF57NO
 Staff Warning System - YES

Environment/Operational Information

Weather Data: Illness: Airport Proximity: ON AIRPORT
 Altitude: - UNKNR Loss Departure Point: PHILADELPHIA
 Method: - UNKNR BURLINGTON
 Conditions: - UNKNR Destination: PHILADELPHIA
 Basic Weather: - UNKNR
 Wind Dir./Speed: 270/000 KTS
 Visibility: - 2.000 SM
 Lowest Sky/Clouds: - UNKNR
 Lowest Ceiling: - 1000 FT OVERCAST
 Obstructions to Vision: FOG
 Precipitation: - RAIN
 Condition of Light: - DARK

Pilot-In-Command

Age: 29
 Flight Review: YES
 Hours Since: 1
 Aircraft Type: UNKNR
 Multi-Eng: 3500
 Medical Certificate: VALID MEDICAL-NO WAIVERS/LIMIT
 Flight Time (Hours): 6110
 Total: 6110
 Hours/Model: 576
 Instrument: 600
 Multi-Eng: 3500

Instrument Rating(s) - AIRPLANE

THE PILOT SAID OUT OF THE OVERCAST AT 1000 FT LOWERED FLAPS AND LANDED THE ACFT WITH THE GEAR RETRACTED. THE PILOT SAID HE HAD LOWERED THE GEAR. THE GEAR WARNING HORN REPORTEDLY DID NOT SOUND.

Brief of Accident (continued)

File No. - 59 1/29/84 PHILADELPHIA/PA A/C Reg. No. N99JW Time (Lcl) - 1820 FSI

Occurrence COMPLETE GEAR COLLAPSED
Phase of Operation LANDING - FLARE/TOUCHDOWN

Findings(s)

1. LANDING GEAR/GEAR INDICATING SYSTEM - UNDETERMINED
2. WHEELS UP LANDING - INADVERTENT - PILOT IN COMMAND
3. GEAR COLLAPSE - NOT FOLLOWED - PILOT IN COMMAND

Probable Cause(s)

The National Transportation Safety Board determines that the Probable Cause(s) of this accident is/are finding(s) 1

Brief of Accident

File No. - 534 Date - 2/24/85

A/C Reg. No. N-00P

Call Sign

Time (UTC) - 0105 CST

Basic Information:
 Operator: BUREAU OF AERONAUTICS
 Aircraft: C-119B
 Type: C-119B
 Manufacturer: BOEING
 Model: 369-100
 Serial No.: 10062
 Date of Manufacture: 1962
 No. of Seats: 8
 Crew: 0
 Pass: 0
 Fatal: 0
 Serious: 0
 Minor: 0
 Injuries: 0

ELT Installed/Activated - YES/NO
 Staff Warning System - UNK/UNK

Airport Proximity
 ON AIRPORT

Airport Data
 LOVE
 Runway Ident - 31R
 Runway Lth/Wid - 7751/150
 Runway Surface - CONCRETE
 Runway Status - DRY

Itinerary
 Last Departure Point
 Same as A/C/INC
 Destination
 TEMPELTX

A/C/Airspace
 Type of Flight Plan - VFR
 Type of Clearance - VFR
 Type Airc/Lnds - NONE

Medical Certificate - VALID MEDICAL-NO WAIVERS/LIMIT
 Flight Time (Hours)
 Total - 5224
 Last 24 Hrs - 2
 Make/Model - 381
 Last 30 Days - UNK/RK
 Instrument - 623
 Last 90 Days - 67
 Multi-Eng - 3508

Age - 31
 Number of Flight Hours
 Current - YES
 Months Since - 7
 Aircraft Type - UNK/RK

Instrument Rating(s) - AIRPLANE

THE LANDING GEAR RETRACTED DURING THE TAKEOFF ROLL & THE ACFT DROPPED TO THE RWY SURFACE & SLID TO A STOP. NO
 PERSONNEL WERE INJURED. THE UNPAID PILOT WAS IN THE "OFFER EXTENDED" POSITION. AN EXAM REVEALED THE GEAR HANDLE COULD
 NOT BE MOVED THRU ITS FULL RANGE OF TRAVEL EVEN THOUGH IT WAS MOVED THRU A DENTENT. ALSO, THE FLT'S SEAT ARM WOULD
 SLIGHTLY TOUCH THE GEAR SELECTOR FOR HANDLE WHEN THE SEAT WAS FULL FORWARD.

Brief of Accident (Continued)

File No. - 534 1/24/65 DALLAS, TX A/C Reg. No. N500P Time (Lcl) - 2105 CST

Occurrence GEAR COLLAPSED
Place of Occurrence TAKEOFF - GROUND RUN

Findings(s)

1. LANDING GEAR - UNDETERMINED
2. LANDING GEAR/GEAR LEVER - LOOSE
3. LANDING GEAR/GEAR LEVER - CLEARANCE
4. FUSELAGE/SEAT - CLEARANCE

Probable Cause(s)

The National Transportation Safety Board determines that the Probable Cause(s) of this accident was (were) (1)(1)(1)(1)(1)