



NTSB National Transportation Safety Board

Office of Aviation Safety



Divert to Butte and Loss of Control

Operations
presentation

Fuel Quantity Indicator



Fuel Imbalance

AFM: land as soon as practical when fuel imbalance reaches three-bar differential and difference cannot be balanced



Fuel Imbalance



- Three-bar differential exceeded by 1 hour 25 minutes into flight
 - Fuel pumps cycling
 - Left tank filling
 - Right tank emptying rapidly

Fuel Imbalance



- Divert to Butte occurred 25 minutes later
- 15-bar differential

Fuel Imbalance



- 27-bar differential on arrival at Butte
- Left tank completely full
- Right tank almost empty

Possible Diversion Airports

- At time maximum allowable fuel imbalance exceeded
 - Boise, Idaho
 - Twin Falls, Idaho
 - Challis, Idaho
- At time of diversion to Butte
 - Challis, Idaho
 - Dillon, Montana

1 Hour 25 Minutes



BTM – Butte, MT



BZN – Bozeman, MT



LLJ - Challis, ID



BOI - Boise, ID



TWF - Twin Falls, ID



1 Hour 52 Minutes

BTM – Butte, MT

BZN – Bozeman, MT

LLJ - Challis, ID

DLN - Dillon, MT



2 Hours 7 Minutes

BTM – Butte, MT

BZN – Bozeman, MT

DLN - Dillon, MT



2 Hours 20 Minutes

BTM – Butte, MT

BZN – Bozeman, MT



Decision to Divert

- If pilot had diverted earlier to another airport, outcome of flight would have been different
 - Airplane would have had less severe fuel imbalance
 - Pilot would not have had to contend with deteriorating airplane handling qualities

Decision to Divert

- Should have landed at first opportunity
- Continued to Bozeman and condition worsened
- Did not divert to suitable airport
- Downplayed initial warnings

Descent Into Butte

- Pilot reported airport in sight
 - 8 miles southwest of airport
 - 5,550 feet above runway
- Last recorded radar target
 - 1.8 miles southwest of runway threshold
 - 3,550 feet above runway
- Excessive descent rate

Witness Information

- Witnesses reported that airplane
 - Approached runway at high altitude
 - Flew northwest away from runway
 - Made sharp left turn at 300 feet
 - Entered steep bank and pitched down

Loss of Control

- Maneuvers near runway resulted in increasing left roll angle and steep descent
- Pulling back on control wheel exacerbated rolling moment
- Airplane controllable with left-wing-heavy condition
- Pilot did not maintain control while maneuvering

Summary

- If pilot had used FSII, fuel imbalance would not have occurred
- Fuel imbalance that developed could have been minimized if pilot had followed Pilatus' required procedures



NTSB