



NTSB National Transportation Safety Board

Office of Aviation Safety



Operations

Todd Gunther

Approach Briefing

- Captain briefed approach
 - Inadvertently briefed takeoff airspeeds
 - Airspeed bugs not set correctly

Approach Briefing

- Red Bug was set for “No flap approach” in icing conditions



Crew Duties During Approach

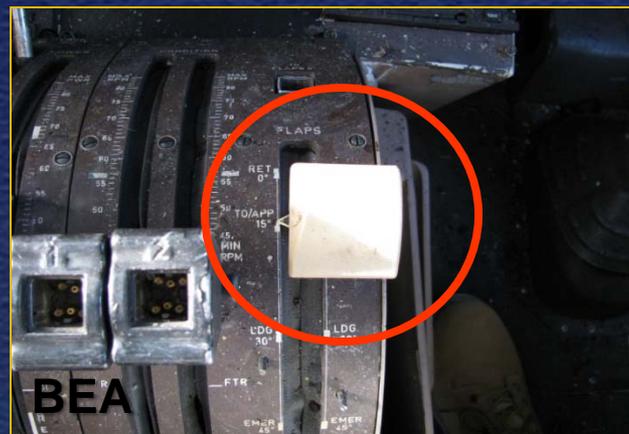
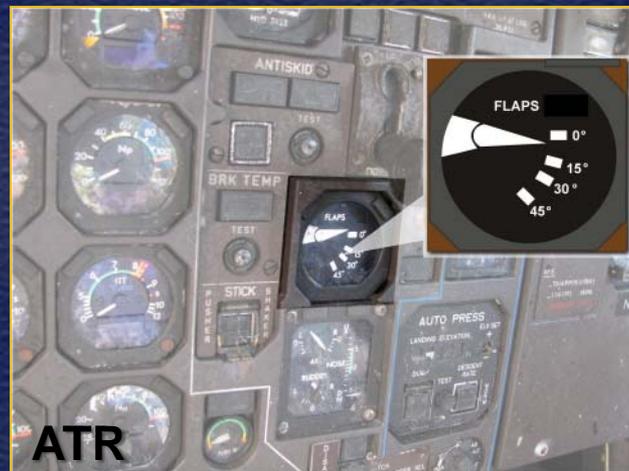
- First officer was pilot flying (PF), captain was pilot monitoring (PM)
- First officer's primary responsibility was to fly airplane
- Captain should have been providing backup and corrective input

Crew Duties During Approach

- First officer called for “flaps fifteen gear down landing check”
- Airplane did not decelerate
- First officer reduced power to 3% torque
- Captain stated, “We have no flaps”

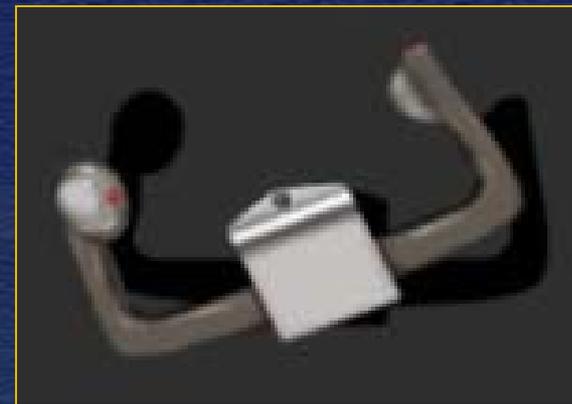
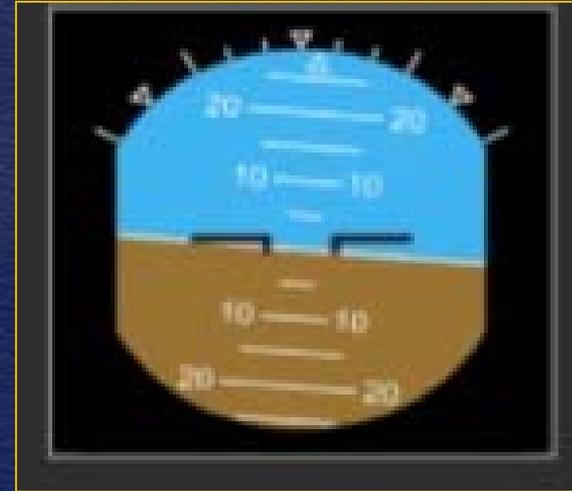
Flap Asymmetry Cues

- Cues for flap asymmetry
 - Disagreement between indicator and flap handle



Missed Asymmetry Cues

- Rolling moment requiring 20-degree wheel displacement



Missed Asymmetry Cues

- Aileron mistrim message
- Right and left flap position fairings



Flap Anomaly Procedure

- Crew actions outlined in Quick Reference Handbook (QRH)
- QRH procedure for flap jam, uncoupled flaps, or flap asymmetry was identical

FLAPS JAM / UNCOUPLED / ASYM	
FLAPS CONTROL LEVER.....	NEAR FLAPS PRESENT POSITION
● When applicable	
REDUCED FLAPS LANDING procedure (2.21).....	APPLY

Empire Airlines



Reduced Flaps Landing

- References
 “Reduced Flaps Landing Procedure”
 - Landing distance
 - Approach speed
 - Landing speed

REDUCED FLAPS LANDING			
GPWS		GPWS OVRD or FLAP OVRD (depending on version)	
STEEP SLOPE APPROACH ($\geq 4.5^\circ$)		PROHIBITED	
FLAPS	LDG DIST FLAPS 30 MULTIPLY BY	APP SPEED	LDG SPEED
0	1.30	VmHB 0 + WIND EFFECT	VmLB 0 + WIND EFFECT
15	1.15	VmHB 15 + WIND EFFECT	VmLB 15 + WIND EFFECT

⚠ **Note:** Refer to Part 4 to determine VmHB, VmLB and LDG DIST.
 ⚠ **Caution:** Tail strike may occur if pitch attitude exceeds 10° during the flare depending upon vertical speed at touchdown.

REDUCED FLAPS LANDING CONFIGURATION				
Flaps 0				
WEIGHT (x 1000 Lb)	Normal SPEEDS		Icing SPEEDS	
	VmHB0	VmLB0	VmHB0	VmLB0
24	109	105	126	122
25	112	107	129	124
26	114	109	131	127
27	116	112	134	129
28	118	114	136	132
29	120	116	139	134
30	122	118	141	136
31	124	120	143	139
32	126	121	146	141
33	128	123	148	143
34	130	125	150	145
35	132	127	152	147
36*	134	129	154	149
37*	135	131	156	151

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Reduced Flaps Landing

- Landing distance corrections
- Go-around maneuver was necessary

Correction on Landing Distances

- Wind.

- per 5 kt tailwind add 10% (valid only for dry and wet runways).
- per 5 kt headwind subtract 2%.

- Airport pressure altitude : per 1000 ft above sea level add 2%.

- Effect of reverse : landing distances are decreased by:

- 7% on dry runway
- 10% on wet runway
- 20% on runway contaminated by water or slush
- 15% on runway contaminated by compact snow
- 30% on runway contaminated by ice.

☝ **Caution:** On contaminated runway, performances without reverse are only to be used for flight preparation (refer to AFM 7.03).

👁 **Note:** Landing on damp runway — A runway is damp when it is not perfectly dry, but when the water which is on it does not give it a shiny appearance. For damp runway, we consider no performance limitation.

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Unstabilized Approach

- Asymmetry occurred outside outer marker
- First Officer allowed airspeed to degrade
- Captain did not monitor airspeed
- Captain deviated from training and guidance for flap anomaly

Unstabilized Approach

- First of three stick-shaker events occurred, autopilot disconnected
- First officer suggested go-around maneuver, captain said “No”
- Captain took control of airplane
- Airplane was high and to right of localizer course, captain attempted to correct, and stick shaker and GPWS triggered

Unstabilized Approach

- Not stable by 1,000 feet
- Incorrect track
- High rate of descent
- Low speed
- Not configured
- Briefings and checklists not performed

Dispatch into Freezing Drizzle

- Dispatched into supercooled large droplet (SLD) icing
- Dispatchers and pilots unaware that airplane not certificated for operations in SLD
- Dispatch not prohibited

Dispatch into Freezing Drizzle

- Materials and training were not provided to all pilots and dispatchers
- FAA oversight
- Dispatchers believed ATR could dispatch into freezing drizzle
- ATR operation in SLD reduced or eliminated safety margins

Dispatch into Freezing Drizzle

- Pilot requests for guidance
- Aircraft Deicing Program (ADP) used to develop guidance for dispatch into SLD
- Used “Weather Conditions” headings in ADP

Dispatch into Freezing Drizzle

HOLDOVER TABLES

TABLE 1. FAA Guidelines for Holdover Times SAE Type I Fluid Mixtures as a Function of Weather Conditions and Outside Air Temperature

CAUTION: THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRE-TAKEOFF CHECK PROCEDURES.

Outside Air Temperature		Approximate Holdover Times Under Various Weather Conditions (hours: minutes)								
Degrees Celsius	Degrees Fahrenheit	Active Frost	Freezing Fog	Snow/Snow Grains			Freezing Drizzle*	Light Freezing Rain	Rain on Cold Soaked Wing**	Other
				Very Light**	Light **	Moderate**				
-3 and above	27 and above	0:45	0:11-0:17	0:18-0:22	0:11-0:18	0:06-0:11	0:09-0:13	0:02-0:05	0:02-0:05	
below -3 to -6	below 27 to 21	0:45	0:08-0:13	0:14-0:17	0:08-0:14	0:05-0:08	0:05-0:09	0:02-0:05	CAUTION: No holdover time guidance exists	
below -6 to -10	below 21 to 14	0:45	0:06-0:10	0:11-0:13	0:06-0:11	0:04-0:06	0:04-0:07	0:02-0:05		
below -10	below 14	0:45	0:05-0:09	0:07-0:09	0:04-0:07	0:02-0:04				

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Dispatch into Freezing Drizzle

A. Aircraft May Operate:

(1) When light freezing rain, light to moderate freezing drizzle, or light to moderate snow is falling, the aircraft may takeoff, provided it is prepared in accordance with approved deicing procedures.

(2) When an adverse icing condition is reported or suspected which the captain and flight follower agree is neither of significant extent nor at a low enough altitude to adversely affect the safety of the flight during climb-out, descent or landing, or if the icing condition is at an altitude or location which can be avoided by proper flight planning.

(3) When an adverse icing condition en route is reported or suspected, provided the captain and Flight Follower carefully analyze the situation and provide adequate fuel to enable the captain to use an alternate route for the safety of the flight.

(4) When light freezing rain, light or moderate freezing drizzle, or light, moderate or heavy snow is falling, aircraft may land.

B. Aircraft May Not Operate:

(1) When moderate or heavy freezing rain or heavy freezing drizzle is falling at the airport.

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Encounter with Icing

- Two icing encounters
 - Cruise, 40-knot decrease in cruise speed
 - Approach, performance degradation

Encounter with Icing

- Icing encounters recognized through visual and ice annunciation
- ANTI ICING and DE ICING were selected





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