Docket No. SA-533

Exhibit No. 2-Z

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C.

Excerpts from Empire ATR 42 Quick Reference handbook (QRH)

(9 Pages)

ATTACHMENT
25

1 EMERGENCY

SEVERE ICING

MINIMUM ICING SPEED	INCREASE RED BUG BY 10KT
PWR MGT	MCT
CL / PL	100% / MCT
AP (if engaged)	FIRMLY HOLD CONTROL WHEEL AND DISENGAGE
SEVERE ICING CONDITIONS	ESCAPE
ATC	NOTIFY

■ **If an unusual roll response or uncommanded roll control movement is observed:**

Push firmly on the control wheel

Flaps 15

■ **If the flaps are extended, do not retract them until the airframe is clear of ice.**

■ **If the aircraft is not clear of ice:**

GPWS	FLAP/GPWS OVRD
Steep Slope Approach (≥ 4.5°)	PROHIBITED
APP/LDG CONF	MAINTAIN FLAPS 15 with "REDUCED FLAPS APP/LDG icing speeds" + 5 kt
LDG DIST FLAPS 30	MULTIPLY BY 1.22

Detection

Visual cue identifying severe icing is characterized by ice covering all or a substantial part of the unheated portion of either side window

and/or

Unexpected decrease in speed or rate of climb

and/or

The following secondary indications:

- Water splashing and streaming on the windshield
- Unusually extensive ice accreted on the airframe in areas not normally observed to collect ice
- Accumulation of ice on the lower surface of the wing aft of the protected areas
- Accumulation of ice on propeller spinner farther aft than normally observed

The following weather conditions may be conducive to severe in-flight icing:

- Visible rain at temperatures close to 0°C ambient air temperature (SAT)
- Droplets that splash or splatter on impact at temperatures close to 0°C ambient air temperature (SAT)

AILERON MISTRIM (ADU MESSAGE) – OR – EXCESSIVE LATERAL TRIM REQUIRED – OR – ABNORMAL FLIGHT CHARACTERISTICS

FLIGHT CONTROLS..... HOLDING FIRMLY
AP.....DISCONNECT

Note: FLY MANUALLY PRIOR TO ADJUSTING THE LATERAL TRIMS.

Note: The autopilot may be re-engaged following adjustment of the lateral trims.

PITCH MISTRIM NOSE UP (DN) / PITCH MISTRIM (ADU MESSAGE)

FLIGHT CONTROLS..... HOLDING FIRMLY
AP.....DISCONNECT

Note: FLY MANUALLY UNTIL RESUMING NORMAL CONDITIONS.

DADC DATA INVALID (ADU MESSAGE)

INSTRUMENTS..... CROSSCHECK
FAULTY ADC.....IDENTIFY
FAULTY ADC..... OFF

- **If ADC 1 is wrong**
  C/B ADC 1.....PULL
- **If ADC 2 is wrong**
  C/B ADC 2.....PULL

ADC FAULT procedure (2.32.) ..... APPLY

2 FOLLOWING FAILURE – FLIGHT CONTROL

FLAPS UNLK

■ **If before V1**
TAKE OFF ..... ABORT
■ **If after V1**
VR, V2 ..... INCREASE BY 10 KT
■ **If alarm occurs during approach**
GO AROUND procedure ..... APPLY
VGA ..... INCREASE BY 10 KT

● **When possible**
FLAPS 0
REDUCED FLAPS LANDING procedure (2.21) ..... APPLY

FLAPS JAM / UNCOUPLED / ASYM

FLAPS CONTROL LEVER ..... NEAR FLAPS PRESENT POSITION
● **When applicable**
REDUCED FLAPS LANDING procedure (2.21) ..... APPLY

REDUCED FLAPS LANDING

GPWS ..... GPWS OVRD or FLAP OVRD (depending on version)
STEEP SLOPE APPROACH (≥4.5°) ..... 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.

STICK PUSHER / SHAKER FAULT

STICK PUSHER / SHAKER ..... OFF
TCAS ..... TA ONLY
VmHB/VmLB FOR ALL CONFIGURATIONS .... INCREASE BY 10 KT
LDG DIST ..... MULTIPLY BY 1.13
Note: Refer to Part 4 to determine VmHB, VmLB and LDG DIST.

3 NORMAL PROCEDURES

ENTERING ICING CONDITIONS

Anti-Icing (Prop, horns, side windows, eng).....CONFIRM ON
Prop Mode Sel.....ACCORDING TO SAT
NP.....SET ≥ 86%

Minimum Maneuver/Operating Icing Speeds..... BUGGED AND OBSERVED

Ice Accretion.....MONITOR

AT FIRST VISUAL INDICATION OF ICE ACCRETION AND AS LONG AS ICING CONDITIONS EXIST

Eng Start Rotary Selector..... CONT RELIGHT
Anti-Icing (Prop, horns, side windows, eng).....CONFIRM ON
Airframe De-Icing..... ON
Eng and Airframe Mode Sel.....ACCORDING TO SAT

Minimum Maneuver/Operating Icing Speeds..... BUGGED AND OBSERVED

Be alert to severe icing detection.

In case of severe icing, refer to 1.09

■If significant vibrations occur:

Both CL..... MAX RPM FOR NOT LESS THAN 5 MINUTES

LEAVING ICING CONDITIONS

Cont Relight, De-Icing and Anti-Icing may be switched off

WHEN THE AIRCRAFT IS VISUALLY VERIFIED FREE OF ICE

Icing AOA caption may be cancelled and normal speeds may be used.

PW 121

33000 Lb

	Speeds	Normal	Icing
NON LIMITING RWY TAKE-OFF FLAPS 15	V1 = VR V2	96 103	106 112
FINAL TAKE OFF		123 (Flaps 0)	123 (Flaps 15)
DRIFT DOWN	VmLB	123 (Flaps 0)	123 (Flaps 15)
MINI EN ROUTE			143 (Flaps 0)
FINAL APPROACH	VmHB (Flaps 30)	99	116

MAX CRUISE 2 ENGINES

FLIGHT LEVEL	Δ ISA													
	−10		−5		0		+5		+10		+15		+20	
80	85.7 755 236 260	*85.7* *698* *226* *249*	85.7 756 235 261	*85.7* *699* *225* *250*	85.7 756 234 262	*85.7* *700* *224* *251*	85.3 754 232 263	*85.7* *700* *223* *253*	80.6 722 226 259	*85.7* *701* *222* *254*	75.9 691 220 254	*81.9* *676* *217* *250*	71.5 661 214 250	*77.1* *645* *211* *245*
100	85.7 741 233 265	*85.7* *687* *224* *254*	85.7 742 232 266	*85.7* *688* *223* *256*	85.7 743 231 267	*85.7* *689* *222* *257*	81.8 718 226 264	*85.7* *689* *221* *259*	77.1 686 220 259	*83.1* *673* *218* *256*	72.7 657 214 255	*78.4* *643* *211* *251*	68.6 628 208 250	*73.8* *614* *205* *246*
120	85.7 727 231 270	*85.7* *676* *222* *260*	85.7 728 230 271	*85.7* *677* *221* *261*	84.5 721 227 271	*85.7* *678* *220* *262*	78.9 685 221 265	*85.1* *676* *218* *263*	73.6 650 214 260	*79.4* *639* *211* *257*	69.4 622 208 255	*74.7* *609* *205* *251*	65.5 596 202 250	*70.5* *582* *198* *245*
140	85.7 715 229 275	*85.7* *665* *220* *265*	85.3 714 227 276	*85.7* *667* *218* *266*	80.7 683 221 272	*85.7* *669* *217* *267*	75.8 652 215 267	*81.6* *643* *212* *263*	70.8 619 208 261	*76.3* *610* *205* *258*	66.0 587 201 255	*71.0* *576* *198* *250*	62.3 563 195 250	*67.0* *551* *191* *245*
160	84.5 697 225 280	*85.7* *656* *217* *270*	80.4 670 220 276	*85.7* *658* *216* *271*	76.5 644 214 272	*82.3* *637* *211* *268*	72.3 617 208 267	*78.0* *610* *206* *263*	67.9 589 202 261	*73.2* *581* *199* *258*	63.4 559 195 255	*68.4* *550* *192* *251*	59.3 531 189 249	*63.8* *520* *185* *244*
180	79.7 655 217 279	*85.7* *650* *214* *275*	75.9 629 212 275	*81.6* *623* *209* *271*	72.2 605 207 271	*77.7* *599* *204* *267*	68.7 582 201 267	*73.9* *575* *198* *263*	64.9 558 196 261	*69.9* *551* *193* *258*	60.8 531 189 255	*65.5* *523* *186* *251*	56.7 504 182 248	*61.1* *494* *178* *243*
200	75.3 617 210 278	*81.0* *612* *207* *274*	71.4 589 204 274	*76.7* *584* *201* *269*	68.0 566 199 269	*73.1* *560* *196* *265*	64.7 545 194 265	*69.6* *539* *191* *261*	61.5 525 188 260	*66.2* *519* *185* *256*	58.0 503 182 254	*62.5* *496* *178* *249*	54.3 478 175 247	*58.6* *471* *171* *241*
220	71.1 582 202 276	*76.6* *579* *199* *273*	67.4 555 197 272	*72.6* *551* *193* *268*	64.0 532 191 267	*68.8* *527* *188* *263*	60.9 511 186 263	*65.6* *507* *182* *258*	58.0 493 180 258	*62.4* *487* *176* *252*	55.1 475 175 252	*59.3* *468* *170* *246*	51.9 454 168 245	*55.9* *447* *163* *239*
240	67.1 548 194 274	*72.3* *545* *191* *271*	63.7 524 189 270	*68.6* *520* *186* *266*	60.3 500 183 265	*64.9* *496* *180* *260*	57.2 479 177 259	*61.5* *474* *173* *254*	54.5 461 172 254	*58.5* *456* *167* *247*	51.8 444 166 248	*55.6* *438* *161* *240*	49.1 427 159 240	*52.9* *421* *154* *233*
250	65.1 531 190 273	*70.2* *529* *187* *270*	61.8 508 184 268	*66.5* *504* *181* *264*	58.5 485 179 263	*63.0* *481* *175* *258*	55.4 464 172 257	*59.6* *460* *169* *251*	52.7 446 167 251	*56.6* *441* *162* *244*	50.1 429 161 244	*53.8* *423* *155* *237*	47.6 412 154 237	*51.1* *406* *148* *228*

TQ % NP = 86 %
Lb/H/ENG
IAS
TAS

TQ % NP = 77 %
Lb/H/ENG
IAS
TAS

NP 77 %
NOT MECH. LIMITED

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

Flaps 15				
WEIGHT (x 1000 Lb)	Normal SPEEDS		Icing SPEEDS	
	VmHB15	VmLB15	VmHB15	VmLB15
24	93	90	107	105
25	94	91	109	107
26	96	93	111	109
27	98	94	114	112
28	100	96	116	114
29	101	98	118	116
30	103	99	121	118
31	105	101	123	120
32	107	102	125	121
33	109	104	127	123
34	110	106	129	125
35	112	107	131	127
36*	114	109	133	129
37*	116	111	135	131

* TO BE USED IN ACCORDANCE WITH LANDING WEIGHT LIMITATIONS

ACTUAL LANDING DISTANCE (FT) – SEA LEVEL

NORMAL CONDITIONS – FLAPS 30°

WEIGHT (1000 LB)			24	26	28	30	32	34	36
RUNWAY CONDITION	DRY		1570	1640	1700	1770	1850	1940	2020
	WET		2030	2155	2275	2395	2515	2635	2750
	CONTAMINATED BY	WATER OR SLUSH < 1/2 in	2250	2370	2490	2630	2770	2940	3110
		COMPACT SNOW	2150	2270	2380	2500	2620	2760	2860
		ICE	3490	3640	3840	4020	4220	4410	4590

ICING CONDITIONS – FLAPS 30° – (FLAPS 45° PROHIBITED)

WEIGHT (1000 LB)			24	26	28	30	32	34	36
RUNWAY CONDITION	DRY		1790	1900	1990	2090	2200	2310	2430
	WET		2430	2590	2755	2920	3085	3250	3430
	CONTAMINATED BY	WATER OR SLUSH < 1/2 in	2760	2930	3100	3300	3500	3730	3980
		COMPACT SNOW	2620	2790	2940	3120	3290	3460	3640
		ICE	4510	4730	5000	5270	5550	5830	6080

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.