Pilot Initial

CRJ-550 Instructor Whiteboard

Session 6

Flight Number 4506

Briefing Items

- Flaps 20 Takeoff
- PRM Approaches
- High Altitude Stalls
- Rapid Decompression (Emergency Descent)
- Loss of Reliable Airspeed
- Flap 1 Landing
- Fuel Imbalance
- Double Engine Failure – Windmill relight
- Descend Via STARs
- Bounced Landing

Flaps 20 Takeoff

- Flaps 20 Takeoffs provide shorter takeoff rolls and steeper climb gradients.
- ACARS takeoff data will state flaps 20.
- Clean Up: For a Flaps 20 takeoff, at acceleration altitude: At V2 + 12, select Flaps 8. At V2 + 20, select Flaps 1 and allow the aircraft to continue its acceleration to VT - 15 knots, then select Flaps 0.

61000 lb TAKE–OFF

Add 1 knot to V_1 & V_R for Wing & Cowl Anti–Ice ON

	Flaps 8								Flaps 20							
	OAT	Altitude X 1000 ft							OAT	Altitude X 1000 ft						
	°C	SL	2	4	6	8	10		°C	SL	2	4	6	8	10	
V_1 118	≤0	0	1	2	3	4	5	V_1 113	≤0	0	1	2	2	3	4	
	20	0	1	2	3	5	6		20	0	1	2	3	4	5	
	30	0	2	3	5	6	7		30	0	1	3	4	5	6	
	40	2	3	4	6	––	––		40	2	3	4	5	––	––	
	50	4	5	––	––	––	––		50	3	4	––	––	––	––	
V_R 119	≤0	0	1	2	2	3	4	V_R 113	≤0	0	1	2	2	3	4	
	20	0	1	2	3	4	5		20	0	1	2	3	4	5	
	30	0	1	2	4	5	6		30	1	2	3	4	5	6	
	40	1	2	3	5	––	––		40	2	3	4	5	––	––	
	50	3	4	––	––	––	––		50	3	4	––	––	––	––	
V_2 132	≤0	0	–1	–1	–1	–1	–1	V_2 125	≤0	0	0	–1	–1	–1	–1	
	20	–1	–1	–1	–2	–1	–1		20	0	0	–1	–1	–1	–1	
	30	–1	–1	–1	–2	–1	–1		30	0	–1	–1	–1	–1	–1	
	40	–1	–1	–2	–1	––	––		40	–1	–1	–1	–1	––	––	
	50	–2	–1	––	––	––	––		50	–1	–1	––	––	––	––	

V_{FTO} / V_{ENR}	FL	SL – 100	200	250	300	350	410
	KIAS	179	181	190	196	203	213

61000 lb LANDING

FLAPS	0°	1°	8°	20°	30°	V_{REF} 45°	V_{2GA} 8°
V_{APPR}	168	152	146	140	136	128	136

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PRM Approaches

- PRM approaches are independent, simultaneous operations to runways spaced between 3000 and less than 4300 feet apart. The approach courses are normally parallel but may be offset by between 2.5 and 3.0 degrees depending on the runway separation.
- One Attention All Users Page (AAUP) is published for each airport where PRM approaches are conducted.
- It is required to brief the General airport procedures and those Runway Specific applicable to the approach that is to be conducted.
- Tune a secondary communication radio to the PRM frequency (or, if silent, to another, e.g. ATIS), set the volume as desired, retune if necessary to the PRM frequency, then deselect the secondary audio. When switched to the tower, re-select the secondary radio audio.
- Though issuance is rare, the “breakout” instruction will begin with the words “Traffic Alert,” followed by the Aircraft call sign, A Turn, Climb (normally) or desend (rarely).

Traffic Alert Lindberg 4506, turn left immediately, heading 040, climb and maintain 5000

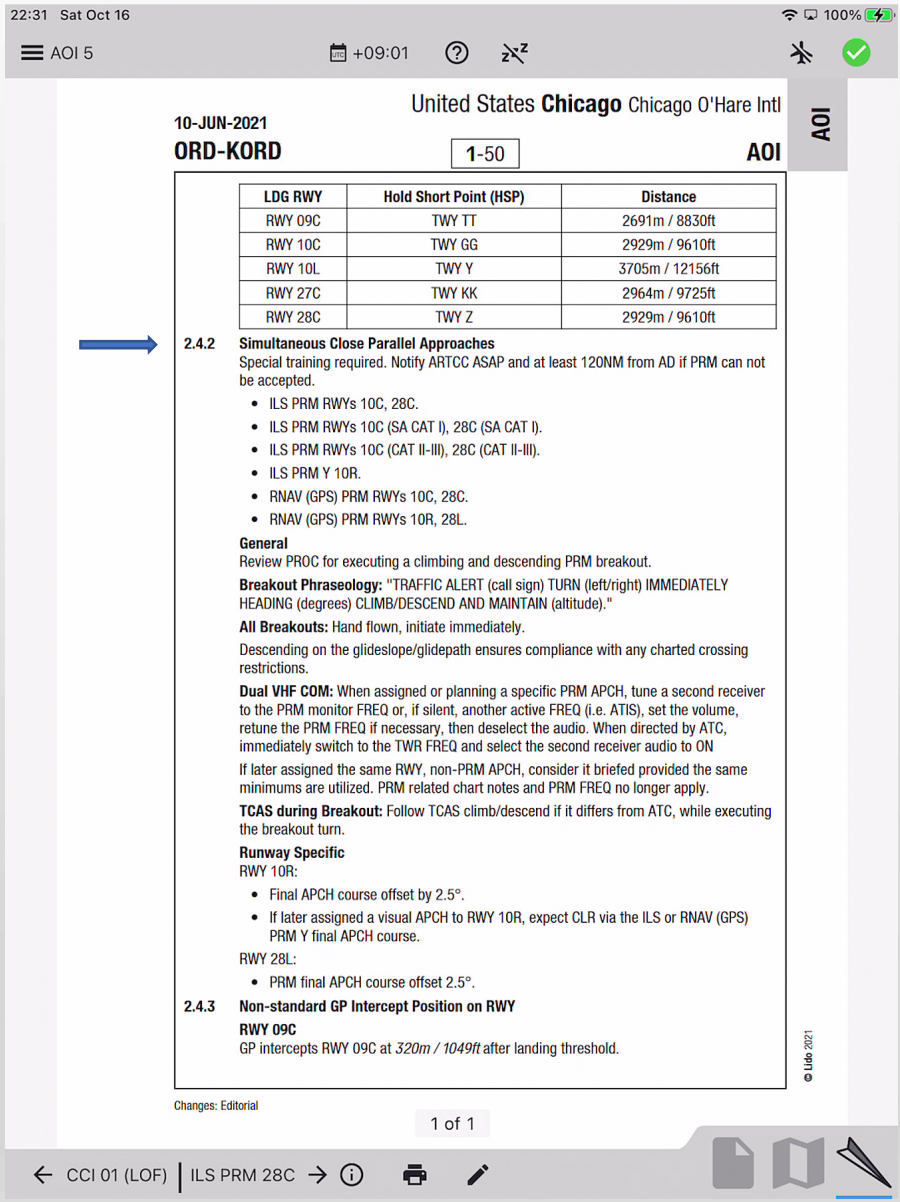
or

Traffic Alert Lindberg 4506, turn right immediately, heading 150, descend and maintain 1500

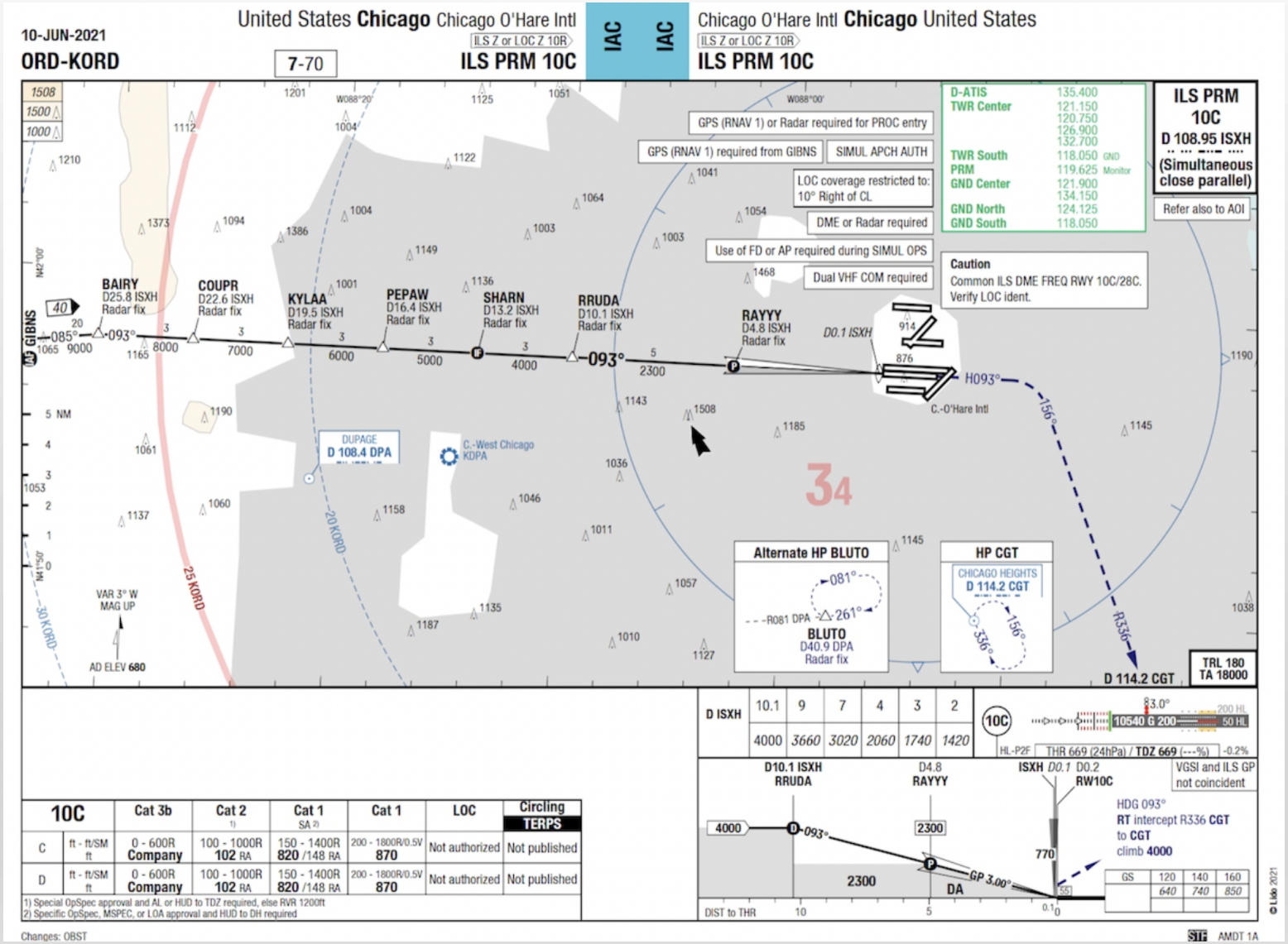
PRM Approaches
AAUP Briefing

The AAUP (Attention All Users Page) brief includes:

- ❑ Reviewing the procedure for executing a breakout.
- ❑ Reviewing the breakout phraseology: “Traffic alert (call sign) turn (L/R) immediately climb/descend and maintain (altitude).”
- ❑ Noting that all breakouts are hand flown, initiate immediately.
- ❑ Noting that descending on the glideslope/glidepath meets any charted crossing restrictions.
- ❑ Noting that later assignment of the non-PRM approach to the same runway, consider it briefed if the same vertically guided minima are utilized. PRM related notes may be disregarded.
- ❑ Follow a TCAS RA climb/descend during a breakout, even if it differs from ATC, while executing the breakout turn.
- ❑ Using dual communications to tune a secondary radio to the PRM monitor frequency, set the volume, then deselect the audio.
- ❑ When directed by ATC, immediately switch to the tower frequency and select the secondary radio audio to ON.



KORD ILS PRM 10C



High Altitude Stalls
High Altitude Aerodynamics

- High altitude is flight above FL250.
- The forces required to make a change to pitch attitude are much less at the high Mach numbers flown at high altitude because there's less aerodynamic damping.
- At a constant airspeed, a given (consider 3° for example) elevator deflection at 35,000 ft. will result in a significantly higher pitch rate than the same elevator deflection at 5,000 ft.. Therefore, the change creates more lift and a higher load factor.
- The angle of attack at which a wing stalls reduces (Smaller angle) with increasing Mach…. So that at high Mach (normally, high altitude), an airplane may enter an accelerated stall at an angle of attack that is less than (smaller) the angle of attack for stalling at lower Mach numbers.
- Smooth and precise control inputs are required at high altitude, you must be aware of this, and apply this knowledge when manually controlling the aircraft. Improper control inputs can result in high load factors, resulting in an inadvertent high-altitude stall.

High Altitude Stalls

Speeds

Climb:

Sea Level to 10,000’	250 KIAS
Above 10,000’	Long Range Climb is 250 KIAS / M 0.70 up to FL320 then transition to normal Climb by FL350
	Normal Climb is 290 KIAS / M 0.74 Above FL 350 climb at NO LESS than Mach 0.74
	High Speed Climb is 320 KIAS / M 0.77

Cruise:

At no time should the aircraft be flown at less than Mach .70 or driftdown speed, whichever is higher. The driftdown speed is based on the aircraft’s weight and altitude and may be found in the speed cards located in the CRJ QRH Volume 1. This will provide adequate protection from stall while maneuvering up to at least 1.3g.

High Altitude Stalls
Stall Recovery

The high-altitude clean stall is meant to simulate an approach to stall condition during the normal cruise phase of flight.

Aircraft buffet, un-commanded roll, stick shaker activated and/or stall warbler on:

1. Autopilot	Disengage, if required
2. Pitch attitude	Lower nose to reduce angle of attack (-15°)
3. Thrust levers	Advance to MAX POWER
4. Roll attitude	Wings level
5. FLIGHT SPOILER	RETRACT

After airspeed increases and stall warning goes out (at between 0.70 and 0.74 Mach, gently) :

6. Pitch attitude	Adjust to minimize altitude loss
7. Thrust levers and aircraft configuration	Adjust as required

Note 1: It is essential that the AOA be immediately reduced, even if this means a loss of altitude.

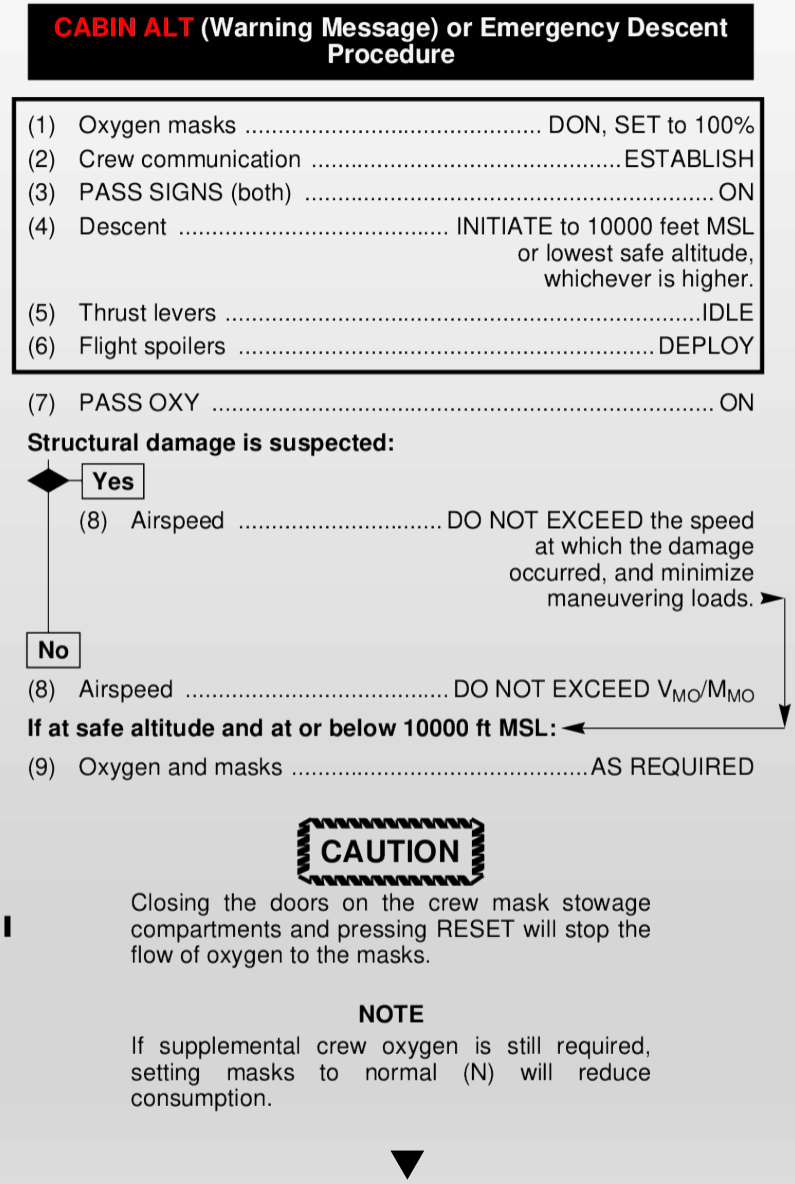
Note 2: Avoid abrupt or aggressive pitch control inputs during recovery. Inappropriate recovery inputs can result in a secondary stall.

Note 3: Height loss resulting from high AOA recovery, especially at cruise altitude and/or low initial thrust conditions, can be significant. (Don't worry about it – recover from the stall and let ATC know what altitude you think you can hold).

Rapid Decompression Emergency Descent

This maneuver affords evaluation of the pilot's use of recommended procedures for their duty position while the aircraft is established in the highest practical rate of descent during emergency conditions or any other situation demanding an immediate and rapid descent.

The primary purpose of this maneuver is to descend the aircraft as rapidly as practical to a safe altitude. In order to maintain positive "G" forces, and for the purpose of clearing altitudes below, a 30 to a 45-degree bank should be established in the initial descent for at least a 90-degree heading change.



CABIN ALT (Warning Message) or Emergency Descent Procedure

(1) Oxygen masks ..... DON, SET to 100%
(2) Crew communication ..... ESTABLISH
(3) PASS SIGNS (both) ..... ON
(4) Descent ..... INITIATE to 10000 feet MSL or lowest safe altitude, whichever is higher.
(5) Thrust levers ..... IDLE
(6) Flight spoilers ..... DEPLOY

(7) PASS OXY ..... ON

Structural damage is suspected:

Yes

(8) Airspeed ..... DO NOT EXCEED the speed at which the damage occurred, and minimize maneuvering loads.

No

(8) Airspeed ..... DO NOT EXCEED V_{MO}/M_{MO}

If at safe altitude and at or below 10000 ft MSL:

(9) Oxygen and masks ..... AS REQUIRED

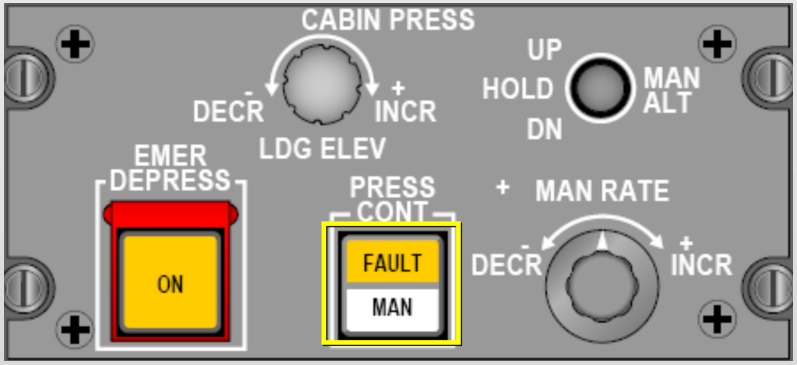
CAUTION

Closing the doors on the crew mask stowage compartments and pressing RESET will stop the flow of oxygen to the masks.

NOTE

If supplemental crew oxygen is still required, setting masks to normal (N) will reduce consumption.

Rapid Decompression Emergency Descent



Door/hatch message(s) displayed/unsafe condition:

Yes

(10) Do not attempt to repressurize the airplane.

(11) Applicable door procedure ..... ACCOMPLISH when at a safe cabin altitude.

Refer to EMER 14–2

Refer to ABNORM 5–1

– END –

No

(10) PRESS CONT .....MAN

(11) MAN ALT ..... DN

(12) MAN RATE ..... MAXIMUM INCR

Control of cabin pressurization is regained:

Yes

(13) Manual Pressurization Control Procedure .....CONTINUE

Refer to ABNORM 2–16

– END –

No

(13) Unpressurized Flight Procedure (PACKs on) .....ACCOMPLISH

Refer to ABNORM 2–18

——— END ———

Loss of Reliable Airspeed

Unreliable Airspeed In-flight

(1) Autopilot ..... DISENGAGE
(2) FDs ..... DESELECT
(3) Use ISI for pitch reference.

Initial take-off climb or go-around is required:

(4) Pitch/N_1 ..... 10 degrees/TOGA from SL to 15000 ft; 5 degrees/CLB above 15000 ft
(5) Aircraft configuration ..... At clean up altitude Gear UP / FLAPS 0
(6) Airplane altitude ..... MAINTAIN lowest safe altitude or higher

CAUTION

Respect stall warning/stick shaker.

(7) Set and monitor pitch and roll using ISI. <1099>
(7) Set and monitor pitch and roll using PFD. <1025> or <1100>

At desired altitude:

(8) Pitch/N_1 ..... Set as per Table A – Level Flight – FLAPS 0
(9) STALL PTCT, PUSHER (left or right) ..... OFF

CAUTION

1. Do not use any FD/autopilot SPEED mode.
2. Rudder travel limits may be inappropriate for phase of flight. For cruise and descent flight, avoid excessive rudder inputs. For approach, landing and go-around flight, differential thrust and aileron input may be required to assist in maintaining directional control. Select the longest runway available with minimum crosswind and turbulence.
3. ISI must be used for pitch reference. <1099>

(10) Flight Director ..... PTCH/ROLL or HDG modes

▼

Please open QRH 2 Page 17-2

Flight Technique:

Set thrust and pitch to target, then adjust pitch to maintain required altitude or path:

- Allow sufficient time to stabilize altitude or path between pitch adjustments.
- If still descending below desired altitude or path, INCREASE pitch using 0.5–degree increments.
- If still climbing above desired altitude or path, DECREASE pitch using 0.5–degree increments.
- If displayed, VSI can be used to monitor required altitude or path.

NOTE

1. Initial pitch target is for reference only. See Flight Technique to adjust pitch as required up to a maximum of +/– 1.5 degrees.
2. If pitch is increased, REDUCE expected speed range by ΔKIAS/ΔMach.
3. If pitch is decreased, INCREASE expected speed range by ΔKIAS/ΔMachs.

Table A – LEVEL FLIGHT – FLAPS 0

ALT (ft)	EXPECTED SPD RANGE KIAS/Mach	EXPECTED SPD CHANGE FOR 0.5 DEGREE CHANGE IN PITCH ΔKIAS/ΔMach	Weight lb Pitch (degree) / Initial Thrust (%N1)						
			45000	50000	55000	60000	65000	70000	75000
40000	220 – 250/ .73 – .82	5/0.01	– 0.5 / 80.9	– 0.5 / 82.2	0.0 / 83.5	0.5 / 83.4	1.0 / 85.7	-- / --	-- / --
35000	230 – 275/ .69 – .81	5/0.01	– 1.0 / 75.6	– 0.5 / 79.4	– 0.5 / 80.3	0.0 / 81.4	0.5 / 82.5	0.5 / 83.6	1.0 / 84.9
30000	250 – 285	10	– 1.0 / 74.9	– 0.5 / 77.8	– 0.5 / 78.6	0.0 / 79.4	0.5 / 80.3	0.5 / 81.2	1.0 / 82.1
25000	250 – 286	10	– 1.0 / 74.2	– 0.5 / 74.8	– 0.5 / 75.5	0.0 / 76.3	0.5 / 77.1	0.5 / 77.8	1.0 / 78.6
20000	250 – 287	10	– 1.0 / 70.6	– 0.5 / 71.2	– 0.5 / 71.9	0.0 / 72.6	0.5 / 73.2	0.5 / 73.8	1.0 / 74.5
15000*	260 – 285	10	– 1.0 / 67.1	– 0.5 / 67.6	– 0.5 / 68.2	0.0 / 68.9	0.5 / 69.5	0.5 / 70.1	1.0 / 70.8
15000**	200 – 235	5	1.0 / 58.9	1.0 / 59.9	1.5 / 61.1	2.0 / 62.4	2.5 / 63.9	3.0 / 65.3	3.5 / 66.8
10000	200 – 230	5	1.0 / 54.6	1.5 / 55.7	2.0 / 56.9	2.5 / 58.2	3.0 / 59.6	3.5 / 61.0	4.0 / 62.5
5000	200 – 230	5	1.0 / 51.0	1.5 / 52.0	2.0 / 53.1	2.5 / 54.3	3.0 / 55.6	3.5 / 56.9	4.0 / 58.3
0	200 – 230	5	1.0 / 47.9	1.5 / 48.8	2.0 / 49.8	2.5 / 51.0	3.0 / 52.2	3.5 / 53.4	4.0 / 54.7
If any indicated speed is outside the expected indicated airspeed range, it should be considered UNRELIABLE.									

* Pitch/N_1 settings for cruise phase
** Pitch/N_1 settings for transition to approach phase

Interpolation is acceptable

The tables start on page 17-7. There are tables for Level Flight, Climb, Descent, Approach, and Approach Flaps 45 Gear Down.

Double Engine Failure

Please open your QRH 2 to EMER 1-4

Double Engine Failure

(1) IGNITION, CONT ..... ON
(2) Airspeed ..... Not less than 240 KIAS

(3) Turn toward nearest suitable airport.

(4) Engines instruments ..... MONITOR for automatic relight.

NOTE
L ENG FLAMEOUT and **R ENG FLAMEOUT** caution messages are displayed.

(5) ADG manual deploy ..... PULL

When ADG power is established:

(6) STAB TRIM, CH 2 ..... SELECT

(7) Oxygen masks (if required) ..... DON

(8) Crew communications ..... ESTABLISH

(9) PASS SIGNS (both) ..... ON

(10) APU (if available, at 37000 feet and below) ..... START

(11) APU GEN ..... CHECK AUTO

If engines continue to run–down and L ENG FLAMEOUT and R ENG FLAMEOUT caution messages are not displayed:

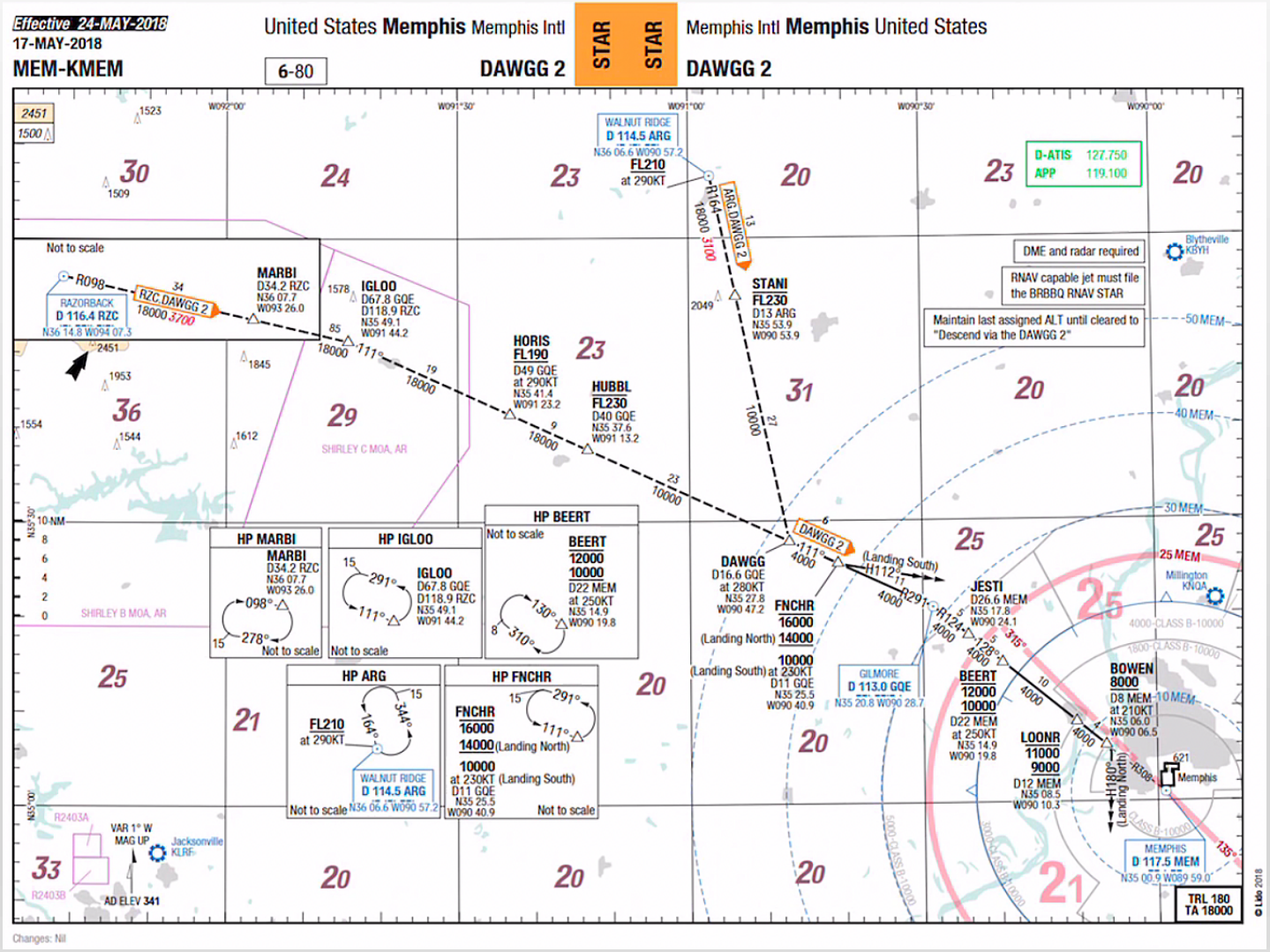
(12) Thrust levers (both) ..... SHUT OFF

- **If relight of either engine is not considered feasible, proceed to step (13).**
- **If windmilling relight is considered feasible, proceed to step (16).**
- **If APU bleed air relight is considered feasible, proceed to step (38).**

(13) **RELIGHT OF EITHER ENGINE IS NOT CONSIDERED FEASIBLE**

▼

Descend Via STAR (MEM DAWGG_)



Bounced Landing

The Ground Lift Dumping (GLD) system is very effective in preventing bounced landings, but its automatic deployment requires that the thrust levers be at IDLE prior to touchdown, as they should be at all landings. Do not attempt to cushion the touchdown with power.

If the pilot believes that thrust must be added and maintained until touchdown to salvage a landing, then a balked/rejected landing should be executed.

Improper landing technique (thrust levers not at IDLE) may result in a shallow bounce. Reducing the thrust levers to idle, while the aircraft is airborne after a bounce, will cause the GLD to deploy. When this occurs, lift will be lost causing the aircraft to touchdown at a descent rate that may exceed the structural capability of the aircraft.

A poorly executed approach and touchdown with a high rate of descent can generate a high, hard bounce that can quickly develop into a hard landing accident. A balked/rejected landing should always be executed following such a bounce. GO AROUND!!!!

Debrief

- ✓ How did you do as Pilot Flying?
- ✓ How did you do as Pilot Monitoring?
- ✓ Instructor Feedback
- ✓ Review and Initial Training Forms

Next Lesson – HOMEWORK!

- Set up your LIDO for KMEM SELPH# OHULO MEM KMEM and save the trip as KMEM-KMEM Lesson 7.
- Review FLAPS FAIL (QRH 2 ABNORM 8-12) Checklist .
- Please make a list of anything that you have questions on