B727
FLIGHT ENGINEER
IOE TRAINING FOLDER

7 JANUARY, 1992

BEFORE TAKEOFF - This section covers the timeframe from entry back into the cockpit after closing the Main Entry Door until takeoff. It includes:

- Before Start
- Pushback & Start
- After Start Flow
- Before Takeoff Checklist (down to the line)
- Below the line

NOTE

When performing a checklist item for which the listed response is "AS REQUIRED," the configuration in which the checklist item is actually placed will be announced (e.g., AUTO BRAKES . . . . MIN). When a challenge concerns equipment not available on that particular aircraft, the crewmember normally responsible for that item shall respond "Not Installed." The Second Officer must be diligent in backing up the checklist responses visually and only accept the book response to each item.

A. Before Start - Get settled quickly upon entry back into the cockpit from closing the Main Entry Door.

- Headset on, monitor both the #2 radio and the Intercomm channels, and strap in. Keep the #3 radio on 130.8 for SELCAL purposes.
- Accomplish your Before Start flow when the Captain calls for the "Before Start" and have it completed prior to your first response on the checklist. The flow is:

  1. Start Valve armed and Engine Start switch covers open
  2. Ext. pwr disconnected
  3. One boost pump on per tank
  4. A pumps off
  5. Press to test and check door lights out (Left and Right MLG doors may be open, the APU light may be on, and in Memphis, the Aft Cargo Door light may be on prior to the Beacon.)
  6. Packs off
  7. Pneumatic pressure 30-45

- The First Officer calls the "Before Start Checklist" complete at the proper time

B. Pushback and Start - After the beacon, ensure that the aft cargo door light is out prior to push. Ensure you understand the Captain's call to start the engines. Cap each individual engine start switch after verifying starter cutout. If start valve closure cannot be positively verified by duct pressure rise, look for the drop in APU EGT as a secondary backup. Close the Start Valve arming switch and the #2 Engine bleeds when the last engine start valve is verified closed.

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C. After Start Procedures - Ensure you hear and acknowledge the Captain's "After Start" call, his "A pumps - on" call, and his Engine Anti-ice response before you start throwing the particular switches. The flow is:

1. Essential pwr checked on each generator, stopping on #3
2. Engine generators auto-paralleled in #1,2,3 order
3. Fuel Panel - set (All boost pumps on and open x-feeds on override pump models when Tk#2 is greater than #1 &#3.)
4. A pumps - checked/on at the Captain's call
5. Second B pump - on
6. Hyd and brake systems - check
7. Left pack - on
8. Engine Anti-ice switches - open/closed on Captain's call

D. Before Takeoff Flow - Performed when clear of congested areas and on the Captain's call of "Cleared to Configure". The flow is...

1. Ignition - flight/continuous
2. Flight Recorder Switch (if installed) - Flight/On
2. Fuel Panel - Set for takeoff
3. Fuel Heat - As Req/Off
4. Hydraulic panel - Checked
5. Ground Venturi-Flt/Grd Sw - Norm/Flt
6. Pressurization - set
7. Outflow Valve Override Sw (if installed) - Armed
8. APR - Checked
9. APU Master Sw - Checked/Off (after one minute unloaded or 375 degrees or less)
10. Wing Anti-Ice valves - checked/Off
11. Seat Belt & Harness - Fastened

NOTE

When a delayed start is planned, you must wait until completion of the DELAYED START checklist to perform the silent items on the BEFORE TAKEOFF checklist.

E. Before Takeoff Checklist - Read on the Captain's command down to the heavy dashed line.

- Be certain that the jumpseaters have their seat belts and shoulder harnesses fastened.
- Ensure that the front seaters are aware of any procedural notes which may appear on the individual runway page in the APM.
- Be alert to runway and/or wind changes on taxi out which might affect the aircraft runway legality.
- Always check the following for the runway that you are taking off on if it is not the runway that you figured for on the WCW:

  a. Weight Capability (reduce for tailwinds!!!)
  b. Standard EPR capability and figures
  c. Procedural notes from the APM runway page.

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When fuel dumping will be required to achieve max landing weight in the event of an after takeoff emergency, teach the crewmember to predetermine the FOB for max landing weight by subtracting the actual ZFW from the Max Landing Weight. For example:

Max Landing Wt		166,000 lbs
Actual ZFW	-	136,000 lbs
Max fuel for Ldg		30,000 lbs
	÷	3
		10,000 lbs per tank for Max Landing Weight

After the Captain's takeoff briefing and the Second Officer has verbally confirmed the takeoff runway, the Second Officer will call "down to the line".

F. Below the Line - Checklist items found below the line are read on the Captain's command. The Captain will call "below the line" when he is cleared into position on the runway. The flightcrew normally holds the strobes until the aircraft is some distance down the runway on takeoff. In this instance, it is permissible to call "Before Takeoff Checklist Complete, except for the Strobes" as the roll commences. Do not under any circumstances, hold the "Before Takeoff Checklist-Complete" call waiting for the PNF to turn on the strobes. On the -200's, the checklist is not complete until the Autopack Trip armed lite illuminates. On aircraft with the APR system, the checklist is not complete until both the Autopack Trip and the APR armed lites illuminate.

Your instructor will discuss the procedures for the failure-to-arm scenario, specifically, the following:

- A discontinued takeoff is not an abort, and abort procedures do not apply.
- The positions of the flaps, specifically the inboard trailing edge, must be checked.
- The MEL must be consulted and the penalties and procedures properly applied to the takeoff runway prior to attempting another takeoff.
- It will not normally be necessary to return to the gate so long as the aircraft can legally takeoff after consulting and applying the MEL procedures and penalties.

DELAYED ENGINE START - Your instructor will discuss the delayed engine start checklist flow with you, and if possible, you will accomplish one. The procedure is discussed in the B727 Ops Manual pages 3-52 and following. Remember:

- The S/O's Before Takeoff flow will not be accomplished until after the last engine is started.

TAKEOFF - The instructor will brief the following:

- The Second Officer seat must be facing forward for all takeoffs and landings and at all times when below 10,000' MSL.
- Your seat must be far enough forward for you to be able to reach the throttles comfortably.
- For night takeoffs, the fuel boost pump low pressure lights on the S/O panel should be full dim.
- Note the takeoff time (hacking the clock is a good technique).
- Watch the engines as power is advanced, then make their panel scan and be back up front prior to the 80 knot call. If a problem is noted on the S/O's panel that might require an abort, immediately announce the abnormal in a normal tone of voice, otherwise keep the small stuff to yourself.
- Once the 80 knot call is made, your total concentration should be on the center forward panel. You should be scanning and cross-checking the EGT's, N1's, and EPR's. Additionally, be alert to any light such as thrust reverser operating or oil pressure low. Insure that the N_1's all reach their nominal figure whenever Engine TAI is used. Call out any engine parameter that is approaching it's limit in a normal tone of voice *if* you are not implying the need to abort. Obviously, quick movements and loud announcements are not the technique being described here.

NOTE

On PDCS equipped aircraft, at least one leg on rides 2 & 3 must be done without using automatic EPR bugs. Your instructor will ask the Captain to put the EPR gauges in manual and turn the intensity of the PDCS screen down to a minimum for their use only.

DEPARTURE/CLIMB - Your instructor will brief the following:

- WTAI should be turned on as briefed not earlier than 400' agl.
- Normal vs quiet EPR climb profiles.
- Throttle technique - The Flight Engineer sets Quiet/Climb EPR on command of the pilot flying. When it's time to move the throttles, don't waste time, do it!
- Apparent loss in A hydraulic quantity when flaps are lowered and/or the landing gear is raised.
- Hydraulic systems scan when the landing gear, flaps, or speed brakes are moving.
- Be alert to disarm the Autopack Trip system if the throttles are retarded before the green arm light is out. I.e. low altitude level off. Normal quiet EPR and cutback EPR procedures do not require disarming the Autopack system prior to throttle reduction.
- 90% N_1 rule for initial climb power gouge.
- Cross-check the climb EPR with the table top data at least every 5 degrees of OAT change.
- Sterile cockpit mandated by the FAA when below 10,000' MSL.

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