Boeing 737-800 NG
Standardized Procedures
in a Flight Simulation Environment

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Another practical Aussie Flight Simulation Australia publication

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About this publication

The procedures and checklists in this publication have been articulated specifically for a non-cold and dark start flight scenario in a flight simulator environment. This publication provides the minimum procedural requirements for Captain and First Officer, based on an "engines running" scenario as an entry point into a flight simulator session. For all procedures, the Captain is considered the Pilot Flying (PF)and the First Officer the Pilot Monitoring (PM). The procedures and checklists are based on the revised and simplified Standardized Normal Procedures for the revised Boeing 737 NG flight crew FCOM introduced in 2005.

FOR FLIGHT SIMULATION USE ONLY

Introduction

In the airliner industry, checklists have not always kept pace with advances in aircraft technology and pilot responsibilities. In response to stakeholder enquiries, in 2005 Boeing redesigned the entire Normal Procedures for all their airliner models.

The intent of this initiative was to improve industry safety, efficiency and economy and incorporate lessons learned. The changes made led to a more even distribution of pilot workload and responsibility, a streamlining of checklists and more flexible procedures commensurate with the increased complexity of today's operational environment. Changes made at that time included:

Exterior inspection: A detailed exterior inspection route allowing items to be checked in order of their location, rather than a system by system inspection checklist.

Areas of Responsibility: A redistribution of areas of responsibility and subsequent scan flows has been established. The Captain is now only responsible for those areas that relate to the control and navigation of the aircraft i.e. the MCP, throttle quadrant and trimmers, while the First Officer (F/O) is responsible for all the rest including the entire overhead panel. The Pilot Not Flying is now called Pilot Monitoring (PM). See Figure 3, on page 7 for the delineation of areas of responsibility.

New Normal Checklists: Checklists have been given a "tighter focus" by eliminating several items. These items still have to be done, but to simplify the checklists only the critical items relating to safety have been retained.

A comparison of before and after revision checklists clearly illustrates the simplification of standardized procedures.

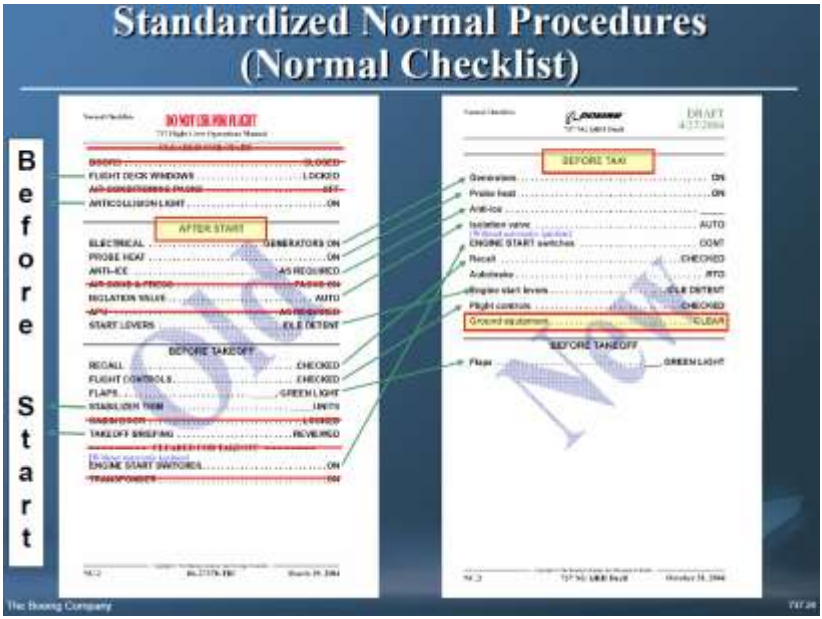

Figure 1: A comparison of old and new checklists
Source: Abbott, Jay (2004) *737 Standardized Procedures,* Boeing Flight Crew Operations Manager. Air crew training materials.

Preliminary Preflight Procedure: The Preliminary Preflight Procedure now assumes that electrical power (GPU) is established.

Preflight Procedure: The preflight checklist has been considerably shortened to include only the critical items. The FMC can now be programmed after the preliminary preflight procedure. The initial and route data entry should be completed before the flight instrument check and the performance data entry should be entered before the before start checklist. Either pilot can make the FMC entries but the other pilot must verify them. Note that the F/O

manages the whole overhead panel and that the fuel and hydraulic pumps remain off until engines are ready to start.

Before Start Procedure: FMC performance data is now entered and V2 is then entered into the MCP and the autothrottle armed. LNAV may be selected. The Before Start procedure now includes some items previously done during taxi. The pushback procedure is now built into Before Start this is where the fuel and hydraulic pumps are switched on, now that they are needed. For engine start, the F/O moves the start switches at the Captains instruction, but the Captain still moves the start levers. The "Oil pressure rising" call has been eliminated.

Before Taxi Procedure: After the ground crew have disconnected, the Captain performs a control check. The F/O selects take-off flap, and does the overhead panel, including start switches for take-off and checks the master caution system. The Before Taxi checklist is then read by the F/O.

Before Takeoff Procedure: The only checklist items required are for Flaps and Stabalizer Trim. However, landing and strobe lights should be attended to at this time.

After Take-off Procedure: The After Take-off checklist now specifically calls for "engine bleeds ON" and "packs to AUTO". Note that these items are done, read and responded to by PM.

Descent and Approach Procedures: The Descent and Approach checklists have been separated to minimise pilot workload during the critical phases of flight. "Autobrakes" have been added to the descent checklist. To accommodate different transition altitudes around the world, the only approach checklist item is "altimeter".

Landing and Shutdown Procedures: These procedures are almost unchanged.

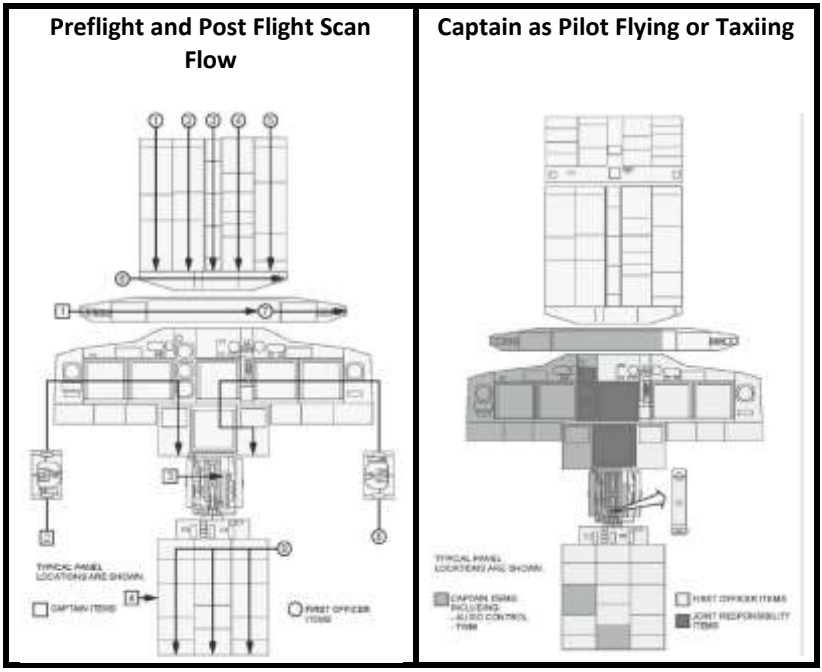

Figure 2: Scan Flows Figure 3: Areas of Responsibility

Source: *Boeing 737-800 Standard Operating Procedure (SOP)* Edition 1, March 2013.

Standardized Procedures and Checklists

It is important not to get ***scan flows*** and ***checklists*** confused. The thing to remember is that in normal operations, procedures are accomplished by scan flow i.e. memorized actions performed in a pre-determined sequence (See Figure 2). In general, only safety-critical items are then checked when the checklists are read - you don't 'read and do'. The idea is that everything in the checklists should already have been done by the time it is called for. Most of the longer 'checklists' that have been produced for flight simulation are actually more like tutorials/step-by-step procedure guides.

A separate checklist card is available.

As the engines are already running, to ensure all essential start-up system requirements have been met by scan flow, procedures here commence with a blend of Preflight and Before Start Normal Checklists.

PREFLIGHT	
Captain	**First Officer**
Parking brake……SET Enter route data into CDU Set his section of MCP & EFIS - Course - Flight Director (Capt first) - A/P disengage Enter performance data into CDU (or FO)	Window Heat……..ON Packs……..ON Pressurization……SET Lights……AS REQUIRED Set his section of MCP & EFIS Enter performance data into CDU (or Captain)

PREFLIGHT CHECKLIST
Captain calls for Preflight checklist Window heat……ON Flight instruments: - Heading (both sides & standby instruments)…… CHECK SET - Altimeters……SET & CHECKED - Parking brake……..ON - Engine start levers……IDLE DETENT Windows……..LOCKED MCP settings: - Thrust settings……..CONFIRMED - Takeoff speeds (V1, VR, V2)…….CONFIRMED & BUGS SET - Trim……____UNITS, 0,0

L-NAV……SELECTED
Anti collision light……ON
Briefing……COMPLETED

- CHECKLIST COMPLETED –

BEFORE TAXI CHECKLIST
Captain calls for Before Taxi checklist
Generators……ON
Probe Heat……ON
Anti-ice……AS REQUIRED
Isolation valve……AUTO
Engine Start Switches……CONT
Recall……CHECKED
Autobrake……RTO
Engine Start Levers……IDLE DETENT
Flight Controls……CHECKED
Ground Equipment……CLEAR
Taxi Light……ON

- CHECKLIST COMPLETED –

Captain	**First Officer**
Initiate Pushback	Call ATC for taxi clearance Monitor ground traffic and specified taxiways to runway

BEFORE TAKEOFF CHECKLIST
Flaps……..Set ___ Green Light
Taxi Lights……..OFF
Landing lights……..ON
Strobe Lights……ON

- CHECKLIST COMPLETED –

TAKEOFF & CLIMB	
Captain	**First Officer**
Advance throttles to 40% N1, waits for engine stabalization, then push TOGA switches	
	Monitor engine gauges and speed.
80 KNOTS CHECK	Call 80 KNOTS
	V1 & ROTATE
Call for GEAR UP	Notify POSITIVE RATE of climb
	Call 400 feet
Calls for flap retraction and speed set	Retract flaps as requested and set flap speed bug.
Activate L-NAV & V-NAV and A/P CMD.	Engine bleeds……ON
	Packs……AUTO
	Landing Gear……OFF
Call for After Takeoff checklist	Flaps……UP

AFTER TAKEOFF CHECKLIST
Engine Bleeds……..ON
Packs……..AUTO
Landing Gear……..UP & OFF
Flaps……UP, NO LIGHTS

- CHECKLIST COMPLETED –

CRUISE	
Captain	**First Officer**
Monitors and controls MCP	At 10,000 feet, Landing Lights OFF. Set Passenger Signs as needed. Monitor engine instruments Monitor fuel: If centre fuel pump switches were OFF for takeoff and tanks contain more than 1000 lbs, set both centre tank fuel pump switches ON above 10,000 feet. When established in a level altitude at cruise, if centre tank contains more than 1000 lbs and the centre tank fuel pump switches are OFF, set centre tank fuel switches to ON. Set both centre tank fuel pump switches to OFF when centre tank quantity reaches approximately 1000 lbs.

	During the last hour of cruise on ETOPS flights, do a fuel crossfeed valve check. Set one centre tank fuel pump switch to OFF when total centre tank fuel quantity reaches approximately 3000 lbs. Open Crossfeed Valve to minimise fuel imbalance. Turn remaining centre tank fuel pump switch OFF without delay and close the crossfeed valve when the Master Caution and FUEL system annunciator illuminate. If established in level flight for an extended time prior to approach and landing with more than 2000 lbs in the centre tank and the centre tank fuel switches are OFF, one centre tank fuel switches can be turned ON. Open crossfeed valve to minimise fuel imbalance. Turn remaining centre tank fuel pump switch OFF without delay when Master Caution and FUEL system annunciator illuminate.

DESCENT 30 nm before T/D	
Captain	**First Officer**
Call for Descent Checklist Recall……CHECKED Landing Briefing COMPLETED	Obtains ATIS/ATC landing data and enters into CDU. Landing Data advised & SET - VRef ____ - Minimums ____ - Decision Height _____ Autobrake……SET ___ Nav Radios…….AS REQUIRED Passenger Signs...AS NEEDED De-ice……AS REQUIRED At 10,000 feet: Landing Lights……ON

APPROACH	
Altimeters……SET & X-CHECKED	
Missed Approach Alt……..SET	X-CHECKED

LANDING
LANDING CHECKLIST
Engine Start Switches……CONT
Speedbrake……ARMED
Flaps……___, GREEN LIGHT
Gear……DOWN, THREE GREEN

References

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