BOEING 737

Management Reference Guide

Edition CL (3/4/500) + NG (6/7/8/900)
### ICON LEGEND

<table>
<thead>
<tr>
<th>Icon</th>
<th>Title Corresponds To</th>
</tr>
</thead>
<tbody>
<tr>
<td>❌</td>
<td>Critical</td>
</tr>
<tr>
<td>!</td>
<td>Caution</td>
</tr>
<tr>
<td>🔄</td>
<td>Information</td>
</tr>
<tr>
<td>?</td>
<td>Possible Cause(s)</td>
</tr>
<tr>
<td>⚡</td>
<td>System Review</td>
</tr>
<tr>
<td>🔋</td>
<td>Circuit Breaker</td>
</tr>
<tr>
<td>🌍</td>
<td>Power Source</td>
</tr>
<tr>
<td>🐧</td>
<td>Subsequent Failure</td>
</tr>
<tr>
<td>📜</td>
<td>NNC Detail - Topic</td>
</tr>
<tr>
<td>⟩</td>
<td>Continued on Next Page</td>
</tr>
</tbody>
</table>

### Notes
- **Title** corresponds to **ناق** NNC
- Failure or information for which a specific **ناقش** NNC does not exist
- Applies only to specified aircraft type or specified system
## RESOURCES

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DDPG-MEL</td>
<td>Dispatch Deviations Procedures Guide - Minimum Equipment List</td>
</tr>
<tr>
<td>DDPG-CDL</td>
<td>Dispatch Deviations Procedures Guide - Configuration Deviation List</td>
</tr>
<tr>
<td>DDPG-FER</td>
<td>Dispatch Deviations Procedures Guide - Ferry</td>
</tr>
<tr>
<td>DDPG-MISC</td>
<td>Dispatch Deviations Procedures Guide - Miscellaneous</td>
</tr>
<tr>
<td>FCOM</td>
<td>Flight Crew Operating Manual</td>
</tr>
<tr>
<td>FCTM</td>
<td>Flight Crew Training Manual</td>
</tr>
<tr>
<td>FPPM</td>
<td>Flight Planning &amp; Performance Manual</td>
</tr>
<tr>
<td>RTOM</td>
<td>Regulated Takeoff Mass Book</td>
</tr>
<tr>
<td>OPS-A</td>
<td>JAR-OPS 1 - Part A</td>
</tr>
<tr>
<td>OPS-B</td>
<td>JAR-OPS 1 - Part B</td>
</tr>
<tr>
<td>OPS-C</td>
<td>JAR-OPS 1 - Part C</td>
</tr>
<tr>
<td>CAM</td>
<td>Cabin Attendant Manual</td>
</tr>
<tr>
<td>L</td>
<td>OM - Limitations</td>
</tr>
<tr>
<td>SP</td>
<td>OM - Supplementary Procedures</td>
</tr>
<tr>
<td>CI</td>
<td>QRH - Checklist Introduction</td>
</tr>
<tr>
<td>NNC</td>
<td>QRH - Non-normal Checklist</td>
</tr>
<tr>
<td>NNM</td>
<td>QRH - Non-normal Maneuvers</td>
</tr>
<tr>
<td>PI</td>
<td>QRH - Performance Inflight [JAA]</td>
</tr>
<tr>
<td></td>
<td>= PD - Performance Dispatch [FAA]</td>
</tr>
<tr>
<td>MRG</td>
<td>B737 Management Reference Guide</td>
</tr>
</tbody>
</table>

**Note**

Page and section numbers differ from edition to edition and may therefore be different from numbers mentioned in this guide.
Demo 1

the b737 mrg
covers all QRH items
and many more
AUTO SLAT FAIL

ELEVATOR TAB VIBRATION

FSEU INOP

APU LOW OIL PRESSURE

APU DOES NOT SHUT DOWN WHEN SELECTING MCS TO OFF

HYDRAULIC PUMP LOW PRESSURE

ELECTRIC MOTOR DRIVEN PUMP DOES NOT ENGAGE WHEN SELECTED ON

GEAR LEVER WILL NOT MOVE UP AFTER TAKEOFF

PARKING BRAKE WARNING RED LIGHT DOES NOT ILLUMINATE

HIGH ALTITUDE LANDING INOP

EQUIPMENT COOLING OFF

HIGH DUCT PRESSURE

TRIM AIR FAILURE

NG

NG

400-800-900
Demo 2

the b737 mrg
shows flow chart
for all amber caution lights
Loss of DC Power on DC BUS 1 / 2
Rate of Cabin Pressure Change > 2000 ft/min SLE
Cabin Altitude above 15,800 feet
Differential Pressure > 8,75 PSID
Fault in Outflow Valve Control
Fault in Pressurization Controller 1 / 2

OR

AUTO FAIL

One Circuit Card (*1) has failed in either DEU

CDS MAINT

Two or more Circuit Cards (*1) have failed in either DEU
One Circuit Card (*1) has failed in both DEU
Total failure (*2) of either DEU
%N1-%N2-EGT miscompare between DEU 1-2
Data Loader Selector in DEU 1 or 2 pos. (*3)
Hot Batt Bus not powered during DEU init. (*3)

CDS FAULT

(In FLT) Auto Brake Arm Conditions not met
(On GND) Auto Brake System Deactivated
Electric Power Fail (DC BUS 1-2)
Loss of Hydraulic System Pressure
Auto Brake Select Switch not in OFF

AUTO BRAKE DISARM
Demo 3

the b737 mrg
displays a flow diagram
for many systems operation
Auto Brake Select Switch to 1-2-3-MAX
(At least one) Antiskid switch ON and Operational
Wheel Speed Signal less than 60 kt
Air/Gnd Relay Sensing in Air Mode
Rudder Pedal Pressure released
Speed Brake Lever ARMED
(S/B must be DOWN when selecting Auto Brakes)

AUTO BRAKES
ARMED

AND

AUTO FAIL

ALTN

Failure of a single controller
Automatic transfer to remaining controller

AUTO FAIL

ALTN

Failure of both controllers
Switch to MANUAL

Air/Gnd-Relay in FLT
One or both Main Landing Gear not UP & LOCKED
Landing Gear Lever in UP or OFF
Engine No 1 %N2 < 56% (CL) 50% (NG)
System B Pressure supplied to LGTU Valve

AND

LGTU activates

Air/Gnd-Relay in FLT
TE Flaps extended 1 thru 10
EDP System B output pressure < 2.350 PSI
Alternate Flaps Control Switch NOT down

AND

PTU activates
Demo 4

the b737 mrg
contains many color drawings
SYSTEM A

SYSTEM B

LE Flaps - Slats
Auto Slat

TE Flaps

Engine No 2
Thrust Reverser

PTU Control Valve

STBY SYSTEM

45-50 PSI pneumatic pressure

45-50 PSI pneumatic pressure

(CL) (NG)
Demo 5

the b737 mrg contains major panel drawings
Demo 6

the b737 mrg explains how to manage a failure or malfunction
<table>
<thead>
<tr>
<th>Section</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approach</td>
<td>Request Radar Vectors for 15 miles final with wide turns due to 15° bank angle limit</td>
</tr>
<tr>
<td></td>
<td><strong>With a published procedure turn</strong>, adjust outbound leg heading or timing due to limited bank!</td>
</tr>
<tr>
<td></td>
<td>Expect impression to be high on profile due to a high nose-up attitude</td>
</tr>
<tr>
<td>Landing</td>
<td>Burn-off Fuel to practical minimum in order to reduce Landing Weight</td>
</tr>
<tr>
<td></td>
<td>Choose RWY :</td>
</tr>
<tr>
<td></td>
<td>- Weather forecast at ETA (= after fuel burn-off)</td>
</tr>
<tr>
<td></td>
<td>and landing minima (200 ft / 700 m)</td>
</tr>
<tr>
<td></td>
<td>- Refer to [PI [NON-NORMAL CONFIG LANDING DISTANCE]]</td>
</tr>
<tr>
<td></td>
<td>- Avoid Wet Runway</td>
</tr>
<tr>
<td></td>
<td>- Verify obstacles for straight out Go-Around</td>
</tr>
<tr>
<td></td>
<td>Autobrakes are not recommended, use maximum reverse thrust and gentle positive braking</td>
</tr>
<tr>
<td></td>
<td>High Speed Tires maximum 195 kts ground speed. Verify tire condition with PNF external inspection</td>
</tr>
<tr>
<td></td>
<td>Be ready to take-over with Nose Wheel steering for directional control upon roll-out</td>
</tr>
<tr>
<td></td>
<td>No flare, positive landing. Apply forward column pressure after touchdown!</td>
</tr>
<tr>
<td>Go-Around</td>
<td>Go-Around with Flaps UP</td>
</tr>
<tr>
<td></td>
<td>Limit Bank Angle to 15° when below 210 kts (or 220 kts)</td>
</tr>
<tr>
<td>Diversion</td>
<td>With the LE Devices extended, limit airspeed to 230 kts and remain below FL 200</td>
</tr>
<tr>
<td></td>
<td>With System B Pressure available, however, <strong>the LE devices can be retracted by positioning the Alternate Flaps Master Switch back to OFF</strong></td>
</tr>
<tr>
<td></td>
<td>Compute Alternate Fuel with penalty 10% with LE devices in Full Extend</td>
</tr>
</tbody>
</table>

(continued next page)
| ATC | "PAN-PAN : Technical problem - No flaps for landing - Landing at high speed"
|----------|----------------------------------|
| Request : | - Weather forecast at ETA (= after fuel burn-off)
|           | - Straight ahead Go-Around due to limited bank
|           | - Fire brigade to inspect Landing Gear at landing roll-out
| Report :  | - Holding time required to burn-off fuel and prepare for approach
|           | - Persons on Board
|           | - Fuel upon landing
|           | - Any or No Dangerous Goods on Board
| Cabin Crew | Prepare for emergency landing and possible emergency evacuation (Optional – depending on company procedures)
|           | Brief passengers for landing. ('Brace' is optional depending on RWY length and condition)
|           | Cabin Crew must report "Cabin Secure" when ready for approach
| Passengers | "Technical problem, airplane under control. Remain in holding for x time to reduce fuel. Follow Cabin Crew instructions."
|           | FO call at 400 ft AGL : "Brace-Brace" (optional)
Demo 7

the b737 mrg
leads you through basic maintenance
tips & tricks to obtain more info
on a failure
The ELEC amber light indicates a fault in the DC or STBY power system. The ELEC amber light operates on GND only.

Additional information on the electrical fault can be obtained from the LAD on the Electrical Panel as follows:

Select **both AC and DC Meter Selectors to TEST** and temporarily push the MAINT switch. The BITE will first illuminate all segments of the LAD (takes about 15 seconds) and then show the fault information. To bypass the BITE display test, push the MAINT switch just after test begins. If there are no faults, the message **NO FAULTS STORED** will appear.

When pushing the MAINT switch again, the next fault will be displayed, if any. Continue until all faults have been displayed and **HOLD BUTTON CLEAR FAULTS** is announced. Pressing the MAINT switch for a few seconds will reset all faults, however this is considered as being a maintenance procedure.
To easily determine which Electrical Bus has failed, refer to the illumination of the four Main Tank Fuel Boost Pump Low Pressure amber Light as described below. One or several Low Pressure amber lights will illuminate when either the Fuel Boost Pump or the Fuel Boost Pump Control has lost its AC respectively its DC power source.

Loss of TFR BUS 1  (confirmed by the TFR BUS OFF amber light, unless its circuit breaker has tripped)

Loss of TFR BUS 2  (confirmed by the TFR BUS OFF amber light, unless its circuit breaker has tripped)

Loss of MAIN BUS 1  (and GEN BUS 1 if BUS OFF amber light is illuminated)

Loss of MAIN BUS 2  (and GEN BUS 2 if BUS OFF amber light is illuminated)
Demo 8

the b737 mrg
alerts for subsequent failures
BLEED TRIP OFF

SUBSEQUENT FAILURE(S)

PACK TRIP OFF / PACK opposite side

Position the failed Pack Switch in OFF, causing the Isolation Valve to open. Use the remaining Pack with the opposite engine.

WING BODY OVERHEAT opposite side

Checklist calls to switch off the affected Engine Bleed Air. However, since this will result in a loss of both packs and thus loss of pressurization, it is recommended to:

- Left WING BODY OVERHEAT:
  - Retard thrust on the respective engine
  - PAN-PAN call
  - Descend to FL 100 in airway
  - Perform NNC [WING BODY OVERHEAT]
  - Continue unpressurized to destination or diversion field

- Right WING BODY OVERHEAT:
  - Retard thrust on the respective engine
  - PAN-PAN call
  - Descend to FL 170 in airway
  - Perform NNC [WING BODY OVERHEAT]
  - Use the APU as an alternate air source

With a low actual Cabin Altitude (intermediate cruising level or while in climb), you can indeed switch off the Affected Engine Bleed Air. The Cabin Altitude will increase by approximately 1500 ft/min SLE, it should not reach 10,000 feet before the airplane's altitude is 10,000 feet.

ENGINE FAILURE or BLEED TRIP OFF opposite side

- Pressurization is lost
- Main Outflow Valve will drive to full close
- Cabin Pressure Rate of Climb will be between 1000 and 2500 ft/min
- PAN-PAN call - Descent in airway
- Descent to 1# INOP service altitude or 17,000 feet where the APU may be used as an alternate air source
- The Eng. No 1 Bleed Air may be selected OFF to extinguish the DUAL BLEED amber light
Demo 9

the b737 mrg proposes methods to work around a problem
On GND

If Hydraulic System A or System B oil quantity indicates below RFL (CL) - RF (NG) the Hydraulic System should be topped by maintenance with oil.

In case of very low quantity, a leak must be suspected and an extra Pre-Flight inspection is recommended.

However, if no maintenance available and a leak is not suspected, you can transfer hydraulic fluid from one System to the other System via Brakes or Reverser Return Lines. Each cycle will transfer approximately 0,50 USG.

TO TRANSFER HYDRAULIC FLUID FROM SYSTEM A TO SYSTEM B

- Verify Aircraft Chocks in place, verify area under Stabilizer is clear
- System A EMDP……………….. ON
- System B EMDP……………….. OFF
- System B Pressure……………….. DEPRESSURIZE
  Move Stabilizer up/down
- Parking Brakes……………….. SET
  Uses hydraulic fluid from System A
- Parking Brakes……………….. RELEASE
  Returns hydraulic fluid to System B

TO TRANSFER HYDRAULIC FLUID FROM SYSTEM B TO SYSTEM A

- Verify area around Engine No. 1 Thrust Reverser is clear
- System A EMDP……………….. OFF
- System B EMDP……………….. OFF
- System A Flight Control Switch……………….. STBY RUD
- Engine No 1 Thrust Reverser……………….. DEPLOY
  Uses hydraulic pressure from Standby System
- System A Flight Control Switch……………….. ON
- System A EMDP……………….. ON
- Engine No 1 Thrust Reverser……………….. STOW
  Uses hydraulic pressure from System A
Demo 10

the b737 mrg
refers to DDPG-MEL,
JAR– FAA, QRH-NNC, OPS
START VALVE DOES NOT CLOSE

⚠️ Shutdown Engine  📄 NNC  [START VALVE OPEN]

- Starter Valve Breaker popped  ⚠️ P6-2A (CL)  ⚠️ P18-2B  P6-2C (NG)

➡️ Apply DDPG-MEL  80-3  [MANUAL START PROCEDURE]

APU FAILURE DURING ENGINE START

enção B  3.10.1.3

APU failure during first Engine Start :

⚠️ - Select Standby Power to BAT to obtain Engine Indications!
- If Engine did not reach self sustaining speed, it must be shut down. The Engine must than be motored for 60" as soon as ASU is available

- Perform APU NNC  [OVERSPEED] or [LOW OIL PRESSURE]

- Check APU ⚠️ P18-5C (CL)

- Check DDPG-MEL  49-1 to dispatch aircraft without APU
  Refer to MRG  [DISPATCH WITH APU INOP]
- Start both Engines with ASU

APU failure after a successful start of first Engine :

⚠️ - Select GEN on BUS

- Perform APU NNC  [OVERSPEED] or [LOW OIL PRESSURE]

- Check APU ⚠️ P18-5C (CL)

- Check DDPG-MEL  49-1 to dispatch aircraft without APU
  Refer to MRG  [DISPATCH WITH APU INOP]
- Use SP 7.3  [ENGINE CROSSBLEED START] to start Eng. No 1
- Switch to SP 2.7  [UNPRESSURIZED T/O] in case a NO BLEED Takeoff was scheduled.
Demo 11

the b737 mrg contains many tables with valuable numbers
## HYDRAULIC SYSTEM

<table>
<thead>
<tr>
<th>Sys</th>
<th>USG</th>
<th>Indication</th>
<th>USG</th>
<th>Ind.</th>
<th>Pressure</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4,80</td>
<td>F 100%</td>
<td>5,70</td>
<td>100%</td>
<td>3000 PSI</td>
<td>Max. Capacity - Overfill</td>
</tr>
<tr>
<td></td>
<td>4,20</td>
<td>RFL 88%</td>
<td>4,70</td>
<td>76%</td>
<td>3000 PSI</td>
<td>Refill Limit</td>
</tr>
<tr>
<td></td>
<td>4,00</td>
<td></td>
<td>4,00</td>
<td>70%</td>
<td>3000 PSI</td>
<td>In Flight Gear Up</td>
</tr>
<tr>
<td></td>
<td>1,80</td>
<td>&lt;1/4 22%</td>
<td>2,30</td>
<td>20%</td>
<td>3000 PSI</td>
<td>Leak in EDP System OK</td>
</tr>
<tr>
<td></td>
<td>1,00</td>
<td>0 0%</td>
<td>1,00</td>
<td>0%</td>
<td>&gt; 0 PSI</td>
<td>Zero QTY indication</td>
</tr>
<tr>
<td></td>
<td>0,00</td>
<td></td>
<td>0,00</td>
<td>0%</td>
<td></td>
<td>Leak in EMDP or lines Loss of System A</td>
</tr>
<tr>
<td>B</td>
<td>7,20</td>
<td>F 100%</td>
<td>10,70</td>
<td>106%</td>
<td>3000 PSI</td>
<td>Max. Capacity - Overfill</td>
</tr>
<tr>
<td></td>
<td>6,40</td>
<td>RFL 88%</td>
<td>6,90</td>
<td>76%</td>
<td>3000 PSI</td>
<td>Refill Limit</td>
</tr>
<tr>
<td></td>
<td>4,95</td>
<td>&gt;1/2 64%</td>
<td>6,60</td>
<td>72%</td>
<td>3000 PSI</td>
<td>Leak in STBY System Loss of STBY System</td>
</tr>
<tr>
<td></td>
<td>3,50</td>
<td>&lt;1/2 40%</td>
<td>1,30</td>
<td>0%</td>
<td>&gt; 0 PSI</td>
<td>Leak in EDP System OK (CL)</td>
</tr>
<tr>
<td></td>
<td>1,30</td>
<td>&gt;0 5%</td>
<td>1,30</td>
<td>0%</td>
<td>&gt; 0 PSI</td>
<td>Loss of System B but sufficient for PTU</td>
</tr>
<tr>
<td></td>
<td>1,00</td>
<td>0 0%</td>
<td>0,00</td>
<td>0%</td>
<td></td>
<td>Zero QTY indication</td>
</tr>
<tr>
<td></td>
<td>0,00</td>
<td></td>
<td>0,00</td>
<td>0%</td>
<td></td>
<td>Leak in PTU Loss of System B + PTU</td>
</tr>
<tr>
<td>STBY</td>
<td>2,80</td>
<td></td>
<td>3,60</td>
<td></td>
<td></td>
<td>Loss of STBY System</td>
</tr>
</tbody>
</table>

## ENGINE

<table>
<thead>
<tr>
<th>Instrument</th>
<th>CB</th>
<th>non-EIS Powered by</th>
<th>MEL</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1%</td>
<td>P6-2D</td>
<td>BATT BUS</td>
<td>77-2</td>
<td>Digital indication not required, analog NOGO</td>
</tr>
<tr>
<td>EGT</td>
<td>P6-2A</td>
<td>DC STDBY BUS</td>
<td>77-6</td>
<td>Digital indication not required, analog NOGO</td>
</tr>
<tr>
<td>N2%</td>
<td>P6-2D</td>
<td>DC STDBY BUS</td>
<td>77-3</td>
<td>Required on Eng. No 1 due to LGTU (*)</td>
</tr>
<tr>
<td>FF</td>
<td>P6-3A</td>
<td>DC BUS 1/2</td>
<td>73-5</td>
<td>One may be INOP provided…</td>
</tr>
<tr>
<td>OIL PRESS</td>
<td>P6-2D</td>
<td>TFR BUS 1/2</td>
<td>79-5</td>
<td>NOGO - Both required</td>
</tr>
<tr>
<td>OIL TEMP</td>
<td>P6-2D</td>
<td>TFR BUS 1/2</td>
<td>79-3</td>
<td>NOGO - Both required</td>
</tr>
</tbody>
</table>
- Runway may not be *wet* or *contaminated*

- Check **Landing distance** at destination and Takeoff alternate
  - PI [Advisory Information – Non-Normal Configuration Landing Distance]

- Aircraft is CAT I (200ft – 700m) ; check WX-minima at destination, Takeoff alternate and enroute.  
  - PI [Table of Requirements]

- No improved climb

**MASS**

Based on PI Introduction Text

<table>
<thead>
<tr>
<th>Type</th>
<th>Mass decrement</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td></td>
</tr>
<tr>
<td>20K</td>
<td>-7000</td>
</tr>
<tr>
<td>22K</td>
<td>-7800</td>
</tr>
<tr>
<td>400</td>
<td></td>
</tr>
<tr>
<td>22K</td>
<td>-7700</td>
</tr>
<tr>
<td>23.5K</td>
<td>-7500</td>
</tr>
<tr>
<td>500</td>
<td></td>
</tr>
<tr>
<td>18.5K</td>
<td>-7500</td>
</tr>
<tr>
<td>20K</td>
<td>-7500</td>
</tr>
</tbody>
</table>

DISPATCH WITH ANTISKID INOP TAKEOFF COMPUTATION
Demo 12

the b737 mrg
contains listing of all
circuit breakers and power sources

(not available for B737-1/200)
**TRANSFER BUS 1 - 115 VAC**

- Air Cond Isolation Valve
- APU SCU
- CDU 1 (*)
- Engine 1 EEC
- Equip Cool Supply Fan Power Altn
- Galley Bus C-D
- GPWS
- Hyd Sys EMDP 1 Sys B
- Radio Navigation DME 1 (*)
- Radio Navigation Radio Altm 1
- TCAS
- TRU 1
- Vacuum Waste Blower
- Yaw Damper Indicator

**XFR BUS 1 SECT 1 - 115 VAC**

- AFCS Stabilizer Trim
- AFCS Sys A Mach Trim AC

**MAIN BUS 1 - 115 VAC**

- Door Area Heater Aft
- Door Area Heater Fwd
- Heaters Drain Mast - Air Mode
- Hose Heaters
- Lavatory Water Heater A-D-E
- Lights – Ext. Logo Illum
- Overwing Door Heater Blankets
- Potable Water Compressor
- Recirc Fan Left Cabin Air (800-900)
- Shaver Outlet 115VAC

**XFR BUS 1 IFE/PASS SEAT PWR**

- ACARS Printer
1 Airplane General, Emergency Equipment, Doors, Windows

<table>
<thead>
<tr>
<th>Component</th>
<th>Page</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aft Cargo Loader Cont</td>
<td>P6-11</td>
<td>D8</td>
</tr>
<tr>
<td>Aft Cargo Loader Drive</td>
<td>P9-</td>
<td>E8</td>
</tr>
<tr>
<td>Door Area Htr-Aft</td>
<td>P91</td>
<td>A14</td>
</tr>
<tr>
<td>Door Area Htr-Fwd</td>
<td>P91</td>
<td>A16</td>
</tr>
<tr>
<td>Door Lock Cabin</td>
<td>P6-3</td>
<td>E1</td>
</tr>
<tr>
<td>Drain SOV</td>
<td>P6-12</td>
<td>B4</td>
</tr>
<tr>
<td>Fwd Airstair Actuator</td>
<td>P6-4</td>
<td>B17</td>
</tr>
</tbody>
</table>
Demo 13

the b737 mrg contains learning tools
**PF actions**
- Interception hdg set: select 'App.' mode and the 2nd A/P (dual channel app.)
- VOR/LOC capture: set Runway QFU on MCP
- GS capture: set missed approach altitude on MCP
- 50 ft: Disengage autopilot (single channel app.)

**PF calls**
- Flaps 5 speed ...
- Flaps ... (Ldg flaps)
- Gear down flaps 15 ...
- Checked
- Checked
- Landing or Go-around
- OM (FAF)
- 500 ft TDZ
- 50 ft

(1) Appropriate flaps position speed
(2) Landing flaps setting for one engine inoperative is flaps 15.

**PNF calls**
- Localiser alive
- Glide slope alive
- Landing checklist completed
- 500 ft (flare armed)
- Minimums
- OM (FAF) ...

**PNF actions**
Position the flap lever and the landing gear lever down on PF command.

Monitor engine parameters and check flight instrument indications.
Demo 14

the b737 mrg contains many thumb-rules
MAXIMUM X-WIND AND TAILWIND

<table>
<thead>
<tr>
<th>Braking Action</th>
<th>POOR</th>
<th>P / M</th>
<th>MEDIUM</th>
<th>M / G</th>
<th>GOOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient μ x 100</td>
<td>91</td>
<td>92</td>
<td>93</td>
<td>94</td>
<td>95</td>
</tr>
<tr>
<td>Max. X-WIND</td>
<td>RWY &lt; 2000m</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Other RWY</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
</tr>
</tbody>
</table>

**Rule of Thumb:**

\[
\text{Max X-WIND} = (\text{BA Coefficient} \times 100) - 15 - 5 \text{ (short runway)}
\]

**AUTO FAIL**

UNSCHEDULED PRESSURIZATION CHANGE

**CABIN ALT / 100 = NAUTICAL MILES REQUIRED**

e.g. The Cabin Altitude Pressure shows 4000 feet, then the controller requires circa 40 NM to descent to Sea Level.

If distance to destination is 40 NM or more, remain in Auto Mode. If track miles to destination is less than 40 NM, select Standby Mode and increase rate of descent.

If destination elevation is well above SL, subtract Land ALT from the Cabin ALT:

\[
\frac{(\text{CABIN ALT} - \text{LAND ALT})}{100} = \text{NAUTICAL MILES REQUIRED}
\]

e.g. The Cabin Altitude Pressure shows 4000 feet and destination elevation is 1500 feet, then the controller requires circa 25 NM to descent to Airport Elev.
21) R/D required to be down at certain point

\[
\text{R/D (feet/min) } = \frac{\text{speed number} \times \text{altitude (feet)}}{\text{distance (NM)}}
\]

Descent 17000 feet in the next 28 NM  \( \text{TAS 240 kt} \)
\( \text{R/D} = \frac{4 \times 17000}{28} = 2400 \text{ feet/min} \)

22) Vertical speed by changing Body Attitude (valid for high speeds)

\[
\text{R/D (feet/min) } = \text{Mach} \times \Delta \text{BA (°)}
\]

Mach 0.74  \( \rightarrow \) One degree BA results in 740 feet/min

23) Vertical speed by changing Body Attitude (valid for lower speeds)

Use TAS or IAS in approach

\[
\text{R/D (feet/min) } = \text{speed number} \times \Delta \text{BA (°)}
\]

Speed TAS 420 kt  BA 3 degrees down
\( \text{R/D} = 7 \times 3 = 2100 \text{ feet/min} \)

24) Distance required if you want to maintain a certain R/D profile

\[
\text{Distance (NM) } = \frac{\text{speed number} \times \text{altitude (feet)}}{\text{R/D}}
\]

Descent 23000 feet at 1000 feet/min  \( \text{TAS 300 kt} \)
\( \text{Distance} = 5 \times 23 = 115 \text{ NM} \)

25) Wind correction for descent distance

\[
\text{Wind Corr (NM) } = 10\% \text{ for each 40 kt component}
\]

Example Thumbrule 20) with 20 kts Tailwind
Add 58 to 87 = 92 NM
Demo 15

the b737 mrg
gives guidelines to many subjects
Veify Cockpit Door locked due to smoke and to avoid passengers in panic from entering the Flight Deck!

Set-up a Cabin Crew Fire Team:

- No 1 is the **Fire Fighter** that will extinguish the fire. He/she wears a Smokehood and holds a fire-extinguisher.
- No 2 is the **Back-Up Fighter** who stands behind the Fire Fighter. In situations with poor visibility due to heavy smoke, the Back-Up Fighter maintains physical contact at all times through his/her arm on the Fire Fighter’s shoulder. He/she also wears a Smokehood and holds a fire-extinguisher.
- No 3 is the **Crowd Controller** that will direct ABP’s to move away from the fire. At least 3 rows should be evacuated. Lift seat arm to place 5 ABP’s on 3 seats.

The Crowd Controller should not wear a Smokehood in order to keep his credibility that everything is safe.

Unwilling or unconscious passengers should be left behind in their seat or on the ground. They can be protected by putting the seat head-cover in their mouth.

In the meantime, he/she informs the captain via interphone on a regular basis:

- type of incident (fire and/or smoke)
- precise location
- amount
- actions that are undertaking by the crew

Never focus on an unwilling passenger, always fight the Fire/Smoke first!

Before moving an unconscious passenger, first check if he or she isn't dead.

The BCF Extinguisher:

- only to be used on visible flames, never on smouldering fire or smoke (except for smoke sorting from side panels)
- always to be kept in upright position
- is most effective to fight open flames at a distance of 3 or 4 metres
- always to be used in shots of max 1 or 2 seconds

Before approaching the fire, first test the Extinguisher by a short shot!

Before opening any door or locker, touch it with the back-side of the hand to sense the heat. Never remove your Smokehood until all items in vicinity are checked.