Boeing 717-200

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www.boeing.com
History

- DC-9 Derivative
  - MD-80
  - MD-90
  - McDonnell-Douglas Merged with Boeing
    - Plans existed for an MD-95 which became the Boeing 717
    - 717 was originally the internal designation for the C/KC-135

www.boeing.com
Operations

- Design for ‘short-haul, high frequency’ use
- Typical seating for 100-120 passengers
- 2 person flight crew with a full glass cockpit
- Total production run of 156 aircraft
Geometry

- **Length**: 124 ft
- **Height**: 29 ft 1 in
- **Wingspan**: 93 ft 4 in
  - Sweep: 24.5 deg at c/4
  - AR = 8.7
  - t/c = 11.6
- **Area**: 1000.7 ft^2
- The wing is based on the DC-9-34

[www.airliners.net](http://www.airliners.net)
Performance

• Two variants: BGW and HGW
• 18,500 to 20,000 lb thrust from 2 engines
• Operating Empty Weight: ~70,000 lb
• MTOW:
  – 110,000 lb (BGW)
  – 121,000 lb (HGW)
• Cruise speed: 438 kt
• Range, typical: 1375 nm BGW, 2060 nm HGW
Engine Performance

• Two Rolls-Royce BR715 engines
• Approximately 25% more efficient than DC-9
• Total fuel load of 3670 gallons
Takeoff/Landing Performance

- $CL_{\text{max}} = 3.14$ (BGW), 3.12 (HGW)
- $V_{\text{stall}} = 102$ kt (BGW), 107 (HGW)
Cruise Performance

• Range
  – 1430 knots (BGW)
  – 2060 knots (HGW)
• Typical Cruise
  – 0.77 Mach
  – 34,200 feet
Flaps similar to DC-9-30

http://adg.stanford.edu/aa241/highlift/highliftintro.html
Airfoil Selection

• Root Airfoil: DSMA-433A/-434A

• Tip Airfoil: DSMA-435A/436A

• Same airfoils as used in MD-80, MD-87, and MD-90


Pressure Distribution Over Wing Planform

Isobar Pattern for Flow Over MD-90 Wing

Lift Coefficient Distributions

Reference: Wakayama (previous slide)
Drag Prediction Using FRICTION

Calculated from 5 components

• Wing
• Fuselage
• Nacelles
• Horizontal Tail
• Vertical Tail

• Assumed Turbulent Flow
Drag Prediction Using FRICTION

• Calculated for Cruise Conditions
  – Altitude = 34,200 ft
  – Mach Number = 0.77

• Program Output
  – Friction Drag = 0.0061
  – Form Drag = 0.0014
  – Total Drag coefficient = 0.0075

Note by Mason: Obviously LOW
References

• www.airliners.net
• www.rolls-royce.com
• www.boeing.com