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

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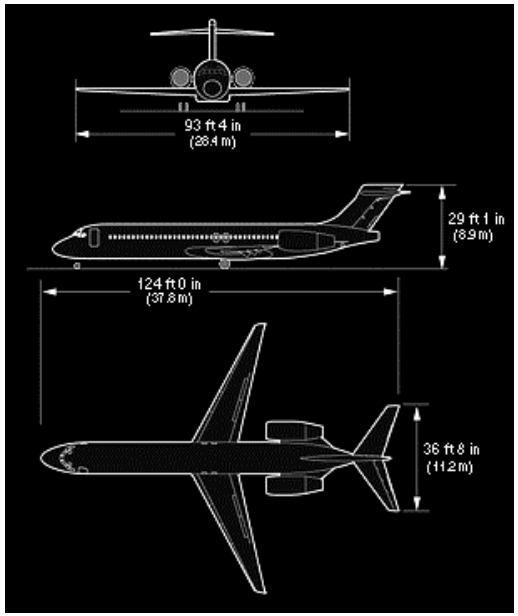
Operations

- 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

www.airliners.net

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



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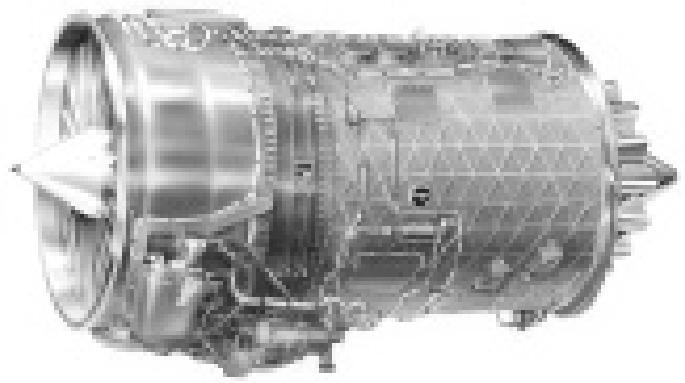
Performance

- 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



www.rolls-royce.com

www.airliners.net

Takeoff/Landing Performance

- CLmax = 3.14 (BGW), 3.12 (HGW)
- Vstall = 102 kt (BGW), 107 (HGW)

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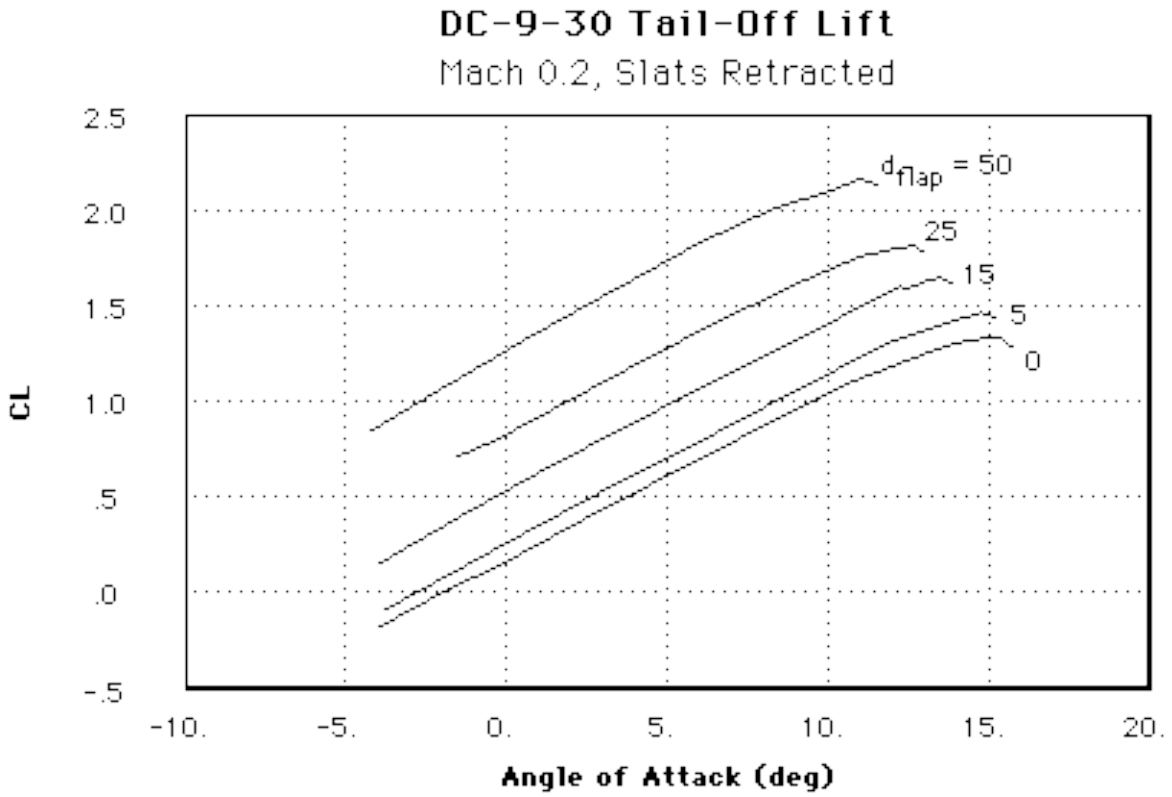
Cruise Performance

- Range
  - 1430 knots (BGW)
  - 2060 knots (HGW)
- Typical Cruise
  - 0.77 Mach
  - 34,200 feet

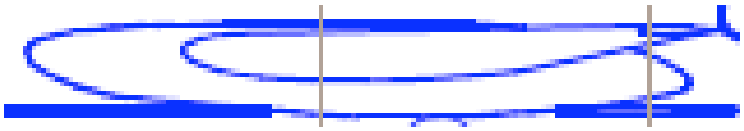
Flaps similar to DC-9-30



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

Airfoil Selection

- Root Airfoil: DSMA-433A/-434A



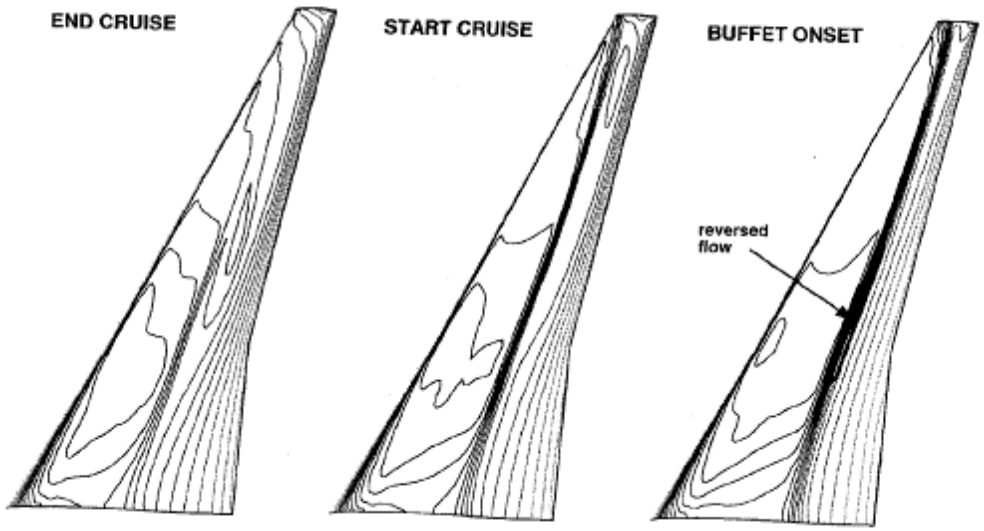
- Tip Airfoil: DSMA-435A/436A

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

DATA: David Lednicer. *The Incomplete Guide to Aircraft Usage.* http://www.ae.uiuc.edu/m-selig/ads/aircraft.html

PICTURE: 717-200 Airplane Characteristics for Airport Planning. http://www.boeing.com/commercial/airports/acaps/717sec2.pdf

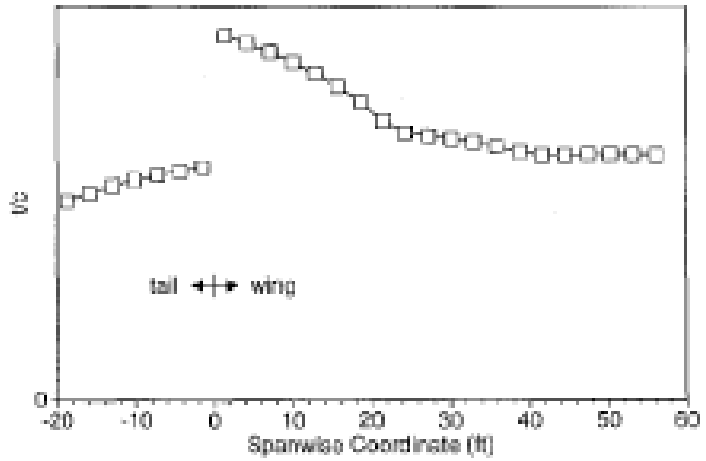
Pressure Distribution Over Wing Planform



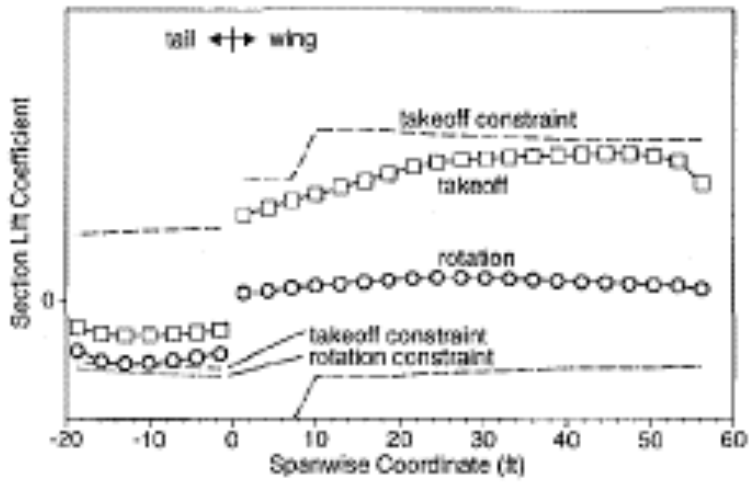
Isobar Pattern for Flow Over MD-90 Wing

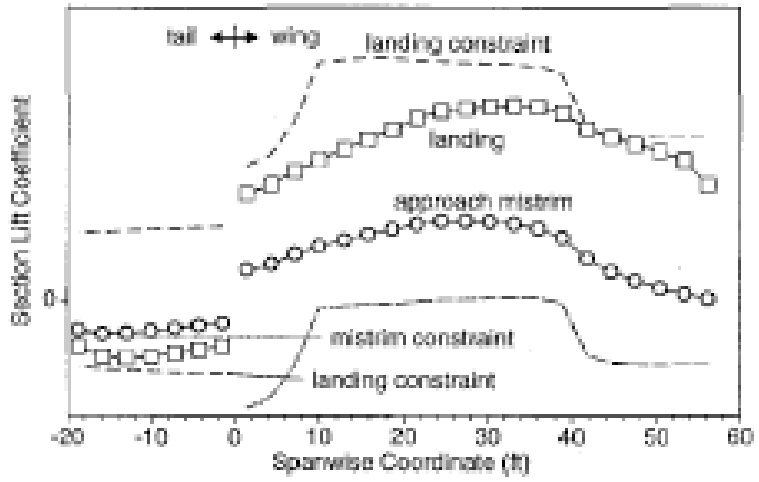
Wakayama, Page, Liebeck. *Multidisciplinary Optimization on an Advanced Composite Wing.* American Institute of Aeronautics and Astronautics, Inc. AIAA-1996-4003-184. 1996.

Lift Coefficient Distributions



Thickness to Chord Distribution (MD-90)





Takeoff Landing

Lift Coefficient Distribution (MD-90)

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 Conditons
  - 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