Docket No. SA-522

Exhibit No. 7-F

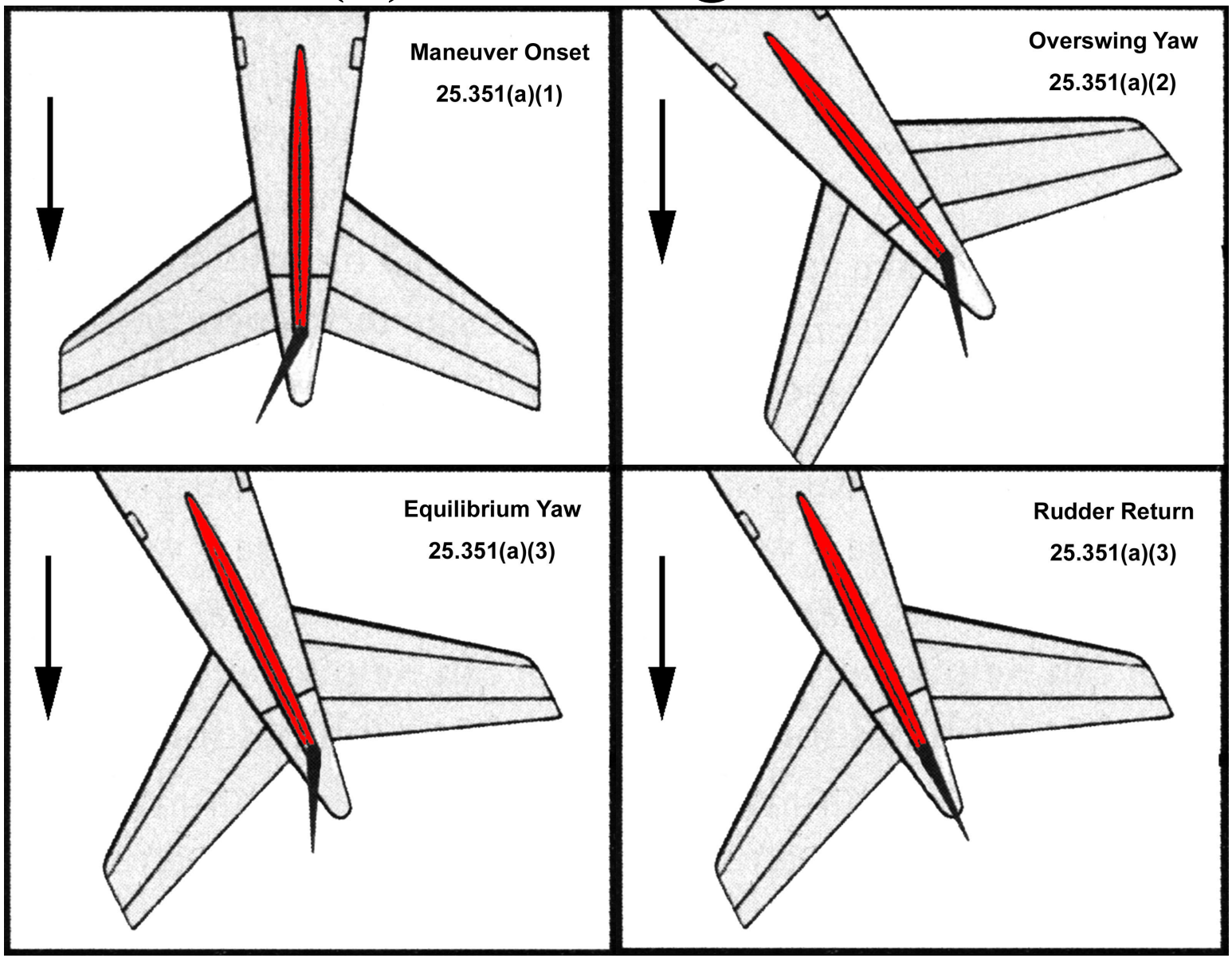
NATIONAL TRANSPORTATION SAFETY BOARD

Washington, D.C.

FAA Loads Exhibits
Yawing Maneuver Sideslip & Rudder Deflection Digram
Yawing Maneuver Time History Diagram
Design Loads & Factor of Safety
Operational Loads Monitoring Program

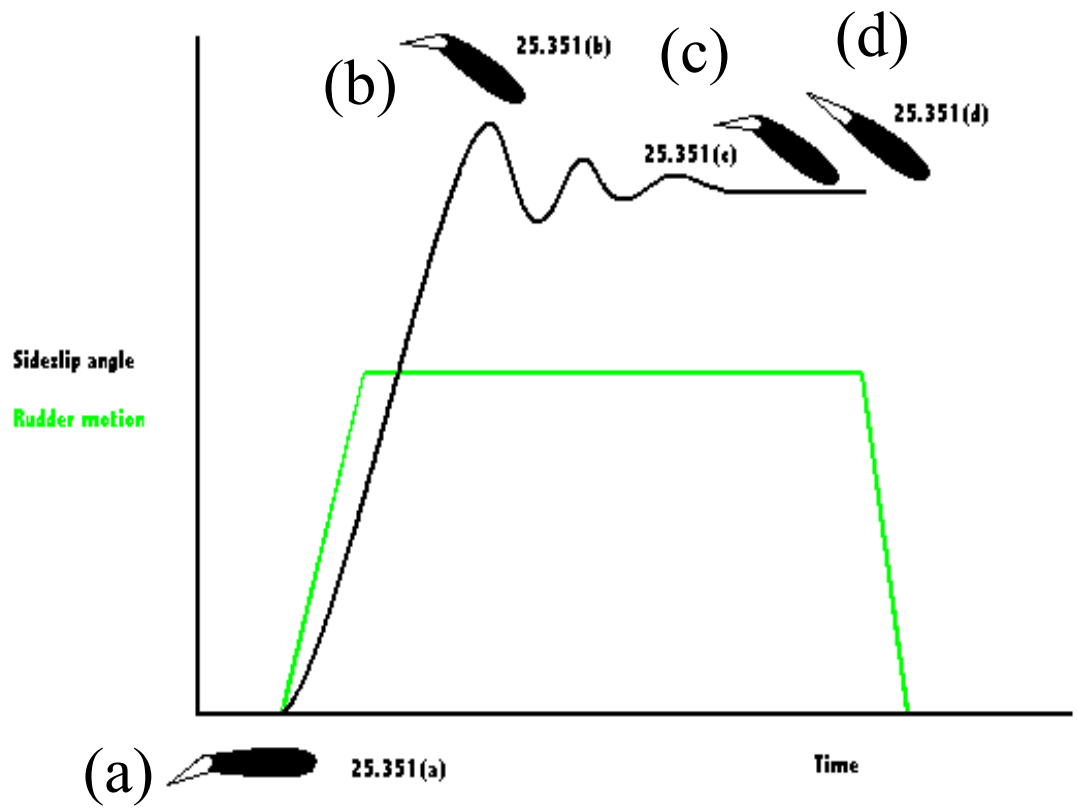
(6 Pages)

25.351(a) Yawing Maneuvers



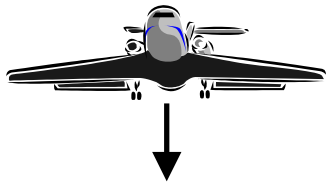
Vertical Tail Maneuver Loads

- Maneuver Loads
- (a) Sudden Rudder Deflection
  - Max Rudder Load
- (b) Overswing Yaw, Pro-Rudder
  - Max Fin Torsion
- (c) Steady Sideslip
  - Similar to (b)
- (d) Neutral Rudder @ Steady Sideslip
  - Maximum Net Maneuver Air Load



- Amendment 25-91 Nomenclature

Certification Load and Factor of Safety Requirements



Load

Ultimate Load UL

UL=1.5 x LL

Limit Load LL

Operating Loads

Ultimate Load is Limit Load multiplied by a Factor of Safety per 25.301(a). The minimum Factor of Safety is 1.5 per 25.305. The structure is to sustain these loads without failure per 25.305(b)

Structures are designed to withstand the highest loads ever expected in service, defined as Limit Load per 25.301(a). The structure is to sustain these loads without detrimental permanent deformation and the deformation may not interfere with safe operation per 25.305(a)

Loads experienced by airplanes in normal day-to-day operation, which for most design conditions and are significantly lower than Limit load. Used for Fatigue and Life Analysis, required per 25.571

Operational Loads vs. Design Loads

- Design Load Accelerations
  - For Conventionally Configured Airplane, Limit Lateral Acceleration is in the Range of 0.3 to 0.4 g
- Operational Loads Accelerations
  - FAA Ongoing Operational Loads Monitoring Programs Indicate 0.2 g is a rarely encountered event

Operational Loads Monitoring Program

- The FAA Operational Loads Monitoring Program is intended to capture operational data for use in Damage Tolerance and Fatigue Evaluation of Structures
  - Airplanes studied to date include: Airbus A-320, McDonnell Douglas MD-82/83, Boeing 727, 737-400 & 767-200ER, Raytheon BE-1900D, and Fokker F27 & F28,