(2) The weight and distribution of occupants, payload, and fuel.

(d) Characteristics of airplane control systems, including range of motion and tolerances for control surfaces, high lift devices, or other moveable surfaces.

(e) Each critical altitude up to the maximum altitude.

§ 23.2205 Interaction of systems and structures.

For airplanes equipped with systems that modify structural performance, alleviate the impact of this subpart's requirements, or provide a means of compliance with this subpart, the applicant must account for the influence and failure of these systems when showing compliance with the requirements of this subpart.

STRUCTURAL LOADS

§ 23.2210 Structural design loads.

(a) The applicant must:

(1) Determine the applicable structural design loads resulting from likely externally or internally applied pressures, forces, or moments that may occur in flight, ground and water operations, ground and water handling, and while the airplane is parked or moored.

(2) Determine the loads required by paragraph (a)(1) of this section at all critical combinations of parameters, on and within the boundaries of the structural design envelope.

(b) The magnitude and distribution of the applicable structural design loads required by this section must be based on physical principles.

§ 23.2215 Flight load conditions.

The applicant must determine the structural design loads resulting from the following flight conditions:

(a) Atmospheric gusts where the magnitude and gradient of these gusts are based on measured gust statistics.

(b) Symmetric and asymmetric maneuvers.

(c) Asymmetric thrust resulting from the failure of a powerplant unit.

§ 23.2220 Ground and water load conditions.

The applicant must determine the structural design loads resulting from taxi, takeoff, landing, and handling conditions on the applicable surface in normal and adverse attitudes and configurations.

§ 23.2225 Component loading conditions.

The applicant must determine the structural design loads acting on:

(a) Each engine mount and its supporting structure such that both are designed to withstand loads resulting from—

(1) Powerplant operation combined with flight gust and maneuver loads; and

(2) For non-reciprocating powerplants, sudden powerplant stoppage.

(b) Each flight control and high-lift surface, their associated system and supporting structure resulting from—

(1) The inertia of each surface and mass balance attachment;

(2) Flight gusts and maneuvers;

(3) Pilot or automated system inputs;

(4) System induced conditions, including jamming and friction; and

(5) Taxi, takeoff, and landing operations on the applicable surface, including downwind taxi and gusts occurring on the applicable surface.

(c) A pressurized cabin resulting from the pressurization differential—

(1) From zero up to the maximum relief pressure combined with gust and maneuver loads;

(2) From zero up to the maximum relief pressure combined with ground and water loads if the airplane may land with the cabin pressurized; and

(3) At the maximum relief pressure multiplied by 1.33, omitting all other loads.

§ 23.2230 Limit and ultimate loads.

The applicant must determine—

(a) The limit loads, which are equal to the structural design loads unless otherwise specified elsewhere in this part; and

(b) The ultimate loads, which are equal to the limit loads multiplied by a 1.5 factor of safety unless otherwise specified elsewhere in this part.

STRUCTURAL PERFORMANCE

§ 23.2235 Structural strength.

The structure must support: