§ 29.777 Cockpit controls.
Cockpit controls must be—
(a) Located to provide convenient operation and to prevent confusion and inadvertent operation; and
(b) Located and arranged with respect to the pilot’s seats so that there is full and unrestricted movement of each control without interference from the cockpit structure or the pilot’s clothing when pilots from 5’2” to 6’0” in height are seated.

§ 29.779 Motion and effect of cockpit controls.
Cockpit controls must be designed so that they operate in accordance with the following movements and actuation:
(a) Flight controls, including the collective pitch control, must operate with a sense of motion which corresponds to the effect on the rotorcraft.
(b) Twist-grip engine power controls must be designed so that, for lefthand operation, the motion of the pilot’s hand is clockwise to increase power when the hand is viewed from the edge containing the index finger. Other engine power controls, excluding the collective control, must operate with a forward motion to increase power.
(c) Normal landing gear controls must operate downward to extend the landing gear.

[Amdt. 29–24, 49 FR 44437, Nov. 6, 1984]

§ 29.783 Doors.
(a) Each closed cabin must have at least one adequate and easily accessible external door.
(b) Each external door must be located, and appropriate operating procedures must be established, to ensure that persons using the door will not be endangered by the rotors, propellers, engine intakes, and exhausts when the operating procedures are used.
(c) There must be means for locking crew and external passenger doors and for preventing their opening in flight inadvertently or as a result of mechanical failure. It must be possible to open external doors from inside and outside the cabin with the rotorcraft on the ground even though persons may be crowded against the door on the inside of the rotorcraft. The means of opening must be simple and obvious and so arranged and marked that it can be readilv located and operated.
(d) There must be reasonable provisions to prevent the jamming of any external doors in a minor crash as a result of fuselage deformation under the following ultimate inertial forces except for cargo or service doors not suitable for use as an exit in an emergency:
(1) Upward—1.5g.
(2) Forward—4.0g.
(3) Sideward—2.0g.
(4) Downward—4.0g.
(e) There must be means for direct visual inspection of the locking mechanism by crewmembers to determine whether the external doors (including passenger, crew, service, and cargo doors) are fully locked. There must be visual means to signal to appropriate crewmembers when normally used external doors are closed and fully locked.
(f) For outward opening external doors usable for entrance or egress, there must be an auxiliary safety latching device to prevent the door from opening when the primary latching mechanism fails. If the door does not meet the requirements of paragraph (c) of this section with this device in place, suitable operating procedures must be established to prevent the use of the device during takeoff and landing.
(g) If an integral stair is installed in a passenger entry door that is qualified as a passenger emergency exit, the stair must be designed so that under the following conditions the effectiveness of passenger emergency egress will not be impaired:
(1) The door, integral stair, and operating mechanism have been subjected to the inertial forces specified in paragraph (d) of this section, acting separately relative to the surrounding structure.
(2) The rotorcraft is in the normal ground attitude and in each of the attitudes corresponding to collapse of one or more legs, or primary members, as applicable, of the landing gear.
(h) Nonjettisonable doors used as ditching emergency exits must have means to enable them to be secured in the open position and remain secure for
emergency egress in sea state conditions prescribed for ditching.

§ 29.785 Seats, berths, litters, safety belts, and harnesses.

(a) Each seat, safety belt, harness, and adjacent part of the rotorcraft at each station designated for occupancy during takeoff and landing must be free of potentially injurious objects, sharp edges, protuberances, and hard surfaces and must be designed so that a person making proper use of these facilities will not suffer serious injury in an emergency landing as a result of the inertial factors specified in §29.561(b) and dynamic conditions specified in §29.562.

(b) Each occupant must be protected from serious head injury by a safety belt plus a shoulder harness that will prevent the head from contacting any injurious object, except as provided for in §29.562(c)(5). A shoulder harness (upper torso restraint), in combination with the safety belt, constitutes a torso restraint system as described in TSO-C114.

(c) Each occupant’s seat must have a combined safety belt and shoulder harness with a single-point release. Each pilot’s combined safety belt and shoulder harness must allow each pilot when seated with safety belt and shoulder harness fastened to perform all functions necessary for flight operations. There must be a means to secure belt and harness when not in use to prevent interference with the operation of the rotorcraft and with rapid egress in an emergency.

(d) If seat backs do not have a firm handhold, there must be hand grips or rails along each aisle to let the occupants steady themselves while using the aisle in moderately rough air.

(e) Each projecting object that would injure persons seated or moving about in the rotorcraft in normal flight must be padded.

(f) Each seat and its supporting structure must be designed for an occupant weight of at least 170 pounds, considering the maximum load factors, inertial forces, and reactions between the occupant, seat, and safety belt or harness corresponding with the applicable flight and ground-load conditions, including the emergency landing conditions of §29.561(b). In addition—

(1) Each pilot seat must be designed for the reactions resulting from the application of the pilot forces prescribed in §29.397; and

(2) The inertial forces prescribed in §29.561(b) must be multiplied by a factor of 1.33 in determining the strength of the attachment of—

(i) Each seat to the structure; and

(ii) Each safety belt or harness to the seat or structure.

(g) When the safety belt and shoulder harness are combined, the rated strength of the safety belt and shoulder harness may not be less than that corresponding to the inertial forces specified in §29.561(b), considering the occupant weight of at least 170 pounds, considering the dimensional characteristics of the restraint system installation, and using a distribution of at least a 60-percent load to the safety belt and at least a 40-percent load to the shoulder harness. If the safety belt is capable of being used without the shoulder harness, the inertial forces specified must be met by the safety belt alone.

(h) When a headrest is used, the headrest and its supporting structure must be designed to resist the inertia forces specified in §29.561, with a 1.33 fitting factor and a head weight of at least 13 pounds.

(i) Each seating device system includes the device such as the seat, the cushions, the occupant restraint system and attachment devices.

(j) Each seating device system may use design features such as crushing or separation of certain parts of the seat in the design to reduce occupant loads for the emergency landing dynamic conditions of §29.562; otherwise, the system must remain intact and must not interfere with rapid evacuation of the rotorcraft.

(k) For purposes of this section, a litter is defined as a device designed to carry a nonambulatory person, primarily in a recumbent position, into and on the rotorcraft. Each berth or litter must be designed to withstand