EURO-MIN-03

AC 27.672. § 27.672 (Amendment 27-21) STABILITY AUGMENTATION, AUTOMATIC, AND POWER-OPERATED SYSTEMS.

a. Explanation.

(1) This rule requires that the pilot be made aware of stability augmentation, automatic, or power-operated system failures which could lead to an unsafe condition. It should be understood that this requirement applies to stability augmentation and supplementary controls and not the primary flight control system that is dealt with under § 27.695 and associated advisory material. Examples of clearly distinguishable warnings include, but are not limited to, an obvious aircraft attitude change following the failure or an audio warning tone. A visual indication itself may not be adequate since detection of a visual warning would normally require special pilot attention. The use of devices such as stick pushers or shakers is not acceptable as a warning means. However, this rule is not intended to eliminate the use of such devices for other purposes. Examples of automatic control systems other than a stability augmentation system would be a pitch axis actuator used for the purpose of demonstrating compliance with longitudinal static stability requirements or a fly-by-wire elevator. For control systems where a series actuator malfunction could degrade control authority, a means should be provided to the pilot to determine actuator alignment (see § 27.1329(b)).

(2) * * * * *

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AC 27.672. § 27.672 (Amendment 27-21) STABILITY AUGMENTATION, AUTOMATIC, AND POWER-OPERATED SYSTEMS.

a. * * * * *

(2) The corrective flight control input following a system failure should be in the logical direction. For example, a malfunction resulting in a nosedown pitch of the aircraft should require a corrective cyclic control input in the aft direction. The system deactivating means does not have to be located on the primary flight control grips; however, it should be easily accessible to the pilot. Consideration should be given to the consequences of inadvertent de-selection of the automatic stabilization system, especially if the deactivation control is mounted on a primary control grip. Malfunctions and subsequent recoveries must be shown throughout the operating envelope of the aircraft. In a case where control authority is decreased following a malfunction, a reasonable flight envelope must be defined wherein compliance with controllability and maneuverability requirements can be demonstrated. This reduced flight envelope must be presented in the flight manual. Compliance with trim and stability characteristics is not required following a malfunction; however, a pilot workload assessment should be made to show that a mission can be safely continued to completion following the worst case single failure.

b. Procedures. A discussion of malfunction test procedures is presented in paragraph AC 27 Appendix B b(6). Controllability and maneuverability test procedures are addressed in paragraph AC 27.143.

FAA-MIN-01

AC 27.683. § 27.683 OPERATION TESTS.

a. Explanation. The rule requires that the control system be free from jamming, excessive friction, and excessive deflection. An operational test is required in which specified loads are applied at the pilot controls and carried through an operating control system.

b. Procedures.

(1) Compliance with the requirements of this rule is obtained by use of a test setup similar to that used for the limit load tests of § 27.681, except the load reactions at the blades (or surfaces) must allow for movement of the blades (or surfaces) as the system is operated through its operating range.

(2) Fixtures are normally affixed to the surfaces (or replace the surfaces) to allow pulley arrangements which provide for movement under load. These fixtures should be evaluated to ensure that system loads up to limit will be applied during the full range of operations of each system.

(3) Each flight control system should be operated through its entire range under a light load and under limit load. As the controls are being operated, the system should be checked for jamming, excessive friction, and excessive deflection. Excessive deflection includes deflection sufficient to contact other systems or structure. Also, if under these limit load conditions the components deflect, the deflection would be considered excessive if there is permanent deformation of any component or supporting structure. Also any deflection that results in an uncorrected condition when the load is released, e.g., if a bellcrank is forced off-center or over-center during load and does not return to the normal position after load release is excessive deflection. Floor panels, wall panels, and other access panels may have to be removed to permit visual checks of the entire control system.

CAA MAJ-09

AC 27.777 § 27.777 COCKPIT CONTROLS.

a. Explanation. This section defines the general cockpit control requirements. Cockpit control location and arrangement with respect to the pilot's seat must be designed to accommodate pilots from 5'2" to 6'0" in height. Pilots within this range should be able to reach all required controls and have sufficient clearance with the structure, panels, etc.

b. * * * * *

CAA MAJ-06

AC 27.1305B. §27.1305 (Amendment 27-29) POWERPLANT INSTRUMENTS.

a. Explanation. Amendment 27-29 added Sections 27.1305(t) and 27.1305(u) to provide for 30-second/2-minute OEI power ratings.

(1) Section 27.1305(t) adds the requirement that a device or means be provided to alert the crew of the use of the 30-second and 2-minute OEI power level. The crew should be alerted when the 30-second or 2-minute interval begins and when the time interval ends. The amount of time spent at the 30-second or 2-minute OEI power levels is at the crew's discretion, unlike the other limits (i.e., torque, measured gas temperature, and gas generator speed) for 30-second OEI that are set by an automatic control required by § 29.1143. The purpose for providing the time interval alerts and automatically controlling the 30-second OEI limits is to free the crew from monitoring the engine instruments during critical phases of flight caused by the loss of an engine. Additional considerations regarding display of usage may be necessary to accommodate partial use of 30-second power interval in combination with longer use of the 2-minute power interval for a total usage of 2-minute 30-second, as allowed by AC 29.1521B.

(2) * * * * *

b. * * * * *

(1) A review of the method to meet the requirements of Section 27.1305(t) should be conducted by the FAA/AUTHORITY Flight Test pilot. A determination should be made as to whether the method used to alert the crew of 30-second or 2-minute OEI power usage can be recognized and understood by the crew.

(2) To meet the requirements of Section 27.1305(u), a device should be installed on the engine or the airframe to record the time and each usage of 30-second and 2-minute OEI power levels. The information on the time and usage of 30-second and 2-minute OEI power should be recoverable from the recording device by ground personnel. The device should not be capable of being reset in flight and should only be capable of being reset by ground personnel. Prior to each flight this device should be capable of being checked for proper operation and to determine if 30-second or 2-minute OEI power levels were used during the previous flight.

CAA MAJ-10

AC 27.1321. § 27.1321 (Amendment 27-13) ARRANGEMENT AND VISIBILITY.

a. Background. Part 27 contains specific requirements for instruments to allow any pilot to operate the rotorcraft safely within authorized limits and to indicate system conditions. The instruments should be arranged for use by any pilot and must be readily visible to the pilot. Instrument location and arrangement, with respect to the pilot's seat, should be designed to accommodate pilots from 5'2" to 6'0" in height. Pilots within this range should be able to see and, where necessary, reach and operate all of the displays.

b. * * * * *.

CAA MAJ-08

AC 27.1585. § 27.1585 (Amendment 27-16) OPERATING PROCEDURES.

a. * * * * *

b. Procedures. Procedural information should be presented in substantial accord with the categories described below:

(1) Normal Procedures. Normal procedures are concerned with peculiarities of the rotorcraft design and operating features encountered in connection with routine operations, including malfunction cases not considered in the other procedures section (i.e., not considered to degrade safety). Material conforming to the above should be presented for each phase of flight, following in sequence from preflight through engine shutdown, and should include, but not be limited to, systems operation (including fuel system information prescribed in § 27.1585(b)), missed approaches, balked landings, etc.

(2) Emergency Malfunction Procedures.

(i) Abnormal procedures are concerned with foreseeable situations, usually entailing a failure condition, in which the use of special systems, and/or the alternate use of regular systems, may be expected to maintain an acceptable level of airworthiness. Typical examples of events considered to entail abnormal procedures are engine failure and associated conditions for safe flight, stopping and restarting engines in flight, extending landing gear or flaps by alternate means, approach with inoperative engine(s), etc.

(ii) Emergency procedures are concerned with foreseeable but unusual situations in which immediate and precise action by the crew, as detailed in the recommended procedures, may be expected to reduce substantially the risk of disaster. Typical examples of incidents considered to be emergencies are fire, ditching, loss of tail rotor thrust or control, etc. It is expected that, in the case of tail rotor failure, the emergency procedures will have been validated by analysis, simulation or any relevant service experience. The analysis or simulation of the tail rotor control failure procedures may be validated where practical by limited flight test.

(iii) * * * * *

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(AC 27-1B, Appendix A, A27.3(b)(2), Instructions for Continued Airworthiness)

(MANUAL IDENTIFICATION)

REQUIREMENTS
(Continued)

13. WORK RECOMMENDED

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14. APPLICABLE WEAR TOLERANCES

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15. TROUBLESHOOTING

Troubleshooting information describing:

a. Probable malfunctions.

b. How to recognize those malfunctions. (Probable Cause). *Some malfunctions could be identified on the basis of a baseline vibration signature provided as follows in the maintenance manual:*

The baseline vibration characteristics of the basic aircraft configuration to be used for maintenance or trouble shooting purposes should be provided as the vibratory aircraft reference in the maintenance manual. These characteristics should be given for specified loading and flight conditions (speed, altitude) with vibration pickups at specified airframe locations decided by the manufacturer. The characteristics should be given as a typical range of vibration levels at these locations and for the most representative frequencies and directions for the rotorcraft concerned (N omega main rotor and n omega tail rotor...). The manufacturers and operators should keep the basic vibration data updated from field/service experience if mutually agreed.

CAA MAJ-02

AC 27 APPENDIX B. AIRWORTHINESS GUIDANCE FOR ROTORCRAFT INSTRUMENT FLIGHT

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b. Procedure

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(8) Cockpit Arrangement.

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(v) Typically the integrity of essential flight information presented to the first pilot must be ensured, by not permitting peripheral systems to be connected to that instrument system. However, with the introduction of integrated avionic systems, it may be possible to accept that additional systems be connected to the first pilot's instrument system if provision has been made to ensure that the integrity of essential flight information is preserved. In addition, equipment must not be connected to operating systems for the second pilot's required instruments unless it is extremely improbable that failure of such additional equipment would affect that operating system.

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