

FEDERAL AVIATION AGENCY  
FLIGHT STANDARDS SERVICE  
Washington 25, D. C.

January 18, 1962

CIVIL AIR REGULATIONS DRAFT RELEASE NO. 62-2

SUBJECT: Certification and Operation of Rotorcraft with External Loads

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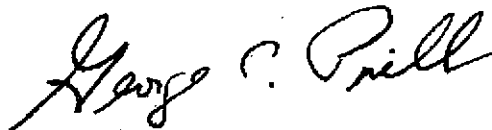
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The Flight Standards Service of the Federal Aviation Agency has under consideration a proposed Special Civil Air Regulation covering the certification and operation of rotorcraft with external loads. The reasons therefor are set forth in the explanatory statement of the attached proposal which is being published in the Federal Register as a notice of proposed rule making.

The Flight Standards Service desires that all persons who will be affected by the requirements of this proposal be fully informed as to its effect upon them and is therefore circulating copies in order to afford interested persons ample opportunity to submit comments as they may desire.

Because of the large number of comments which we anticipate receiving in response to this draft release, we will be unable to acknowledge receipt of each reply. However, you may be assured that all comment will be given careful consideration.

It should be noted that comments must be submitted in duplicate to the Docket Section of the Federal Aviation Agency, and in order to insure consideration must be received on or before March 26, 1962.



Director  
Flight Standards Service

**FEDERAL AVIATION AGENCY  
FLIGHT STANDARDS SERVICE**

[14 CFR Parts 1, 6, 7, 8, 43]

[Regulatory Docket No. 1040; Draft Release No. 62-2]

**NOTICE OF PROPOSED RULE MAKING**

**SPECIAL CIVIL AIR REGULATION**

**Approval and Operation of Rotorcraft With External Loads**

Pursuant to the authority delegated to me by the Administrator (14 CFR 405.27), notice is hereby given that there is under consideration a proposed Special Civil Air Regulation concerning approval for rotorcraft to operate with external loads.

Interested persons may participate in the making of the proposed rules by submitting such written data, views, or arguments as they may desire. Communications should be submitted in duplicate to the Docket Section of the Federal Aviation Agency, Room C-228, 1711 New York Avenue, N. W., Washington 25, D. C. All communications received on or before March 26, 1962, will be considered by the Administrator before taking action upon the proposed rules. The proposals contained in this notice may be changed in the light of the comments received. All comments submitted will be available in the Docket Section for examination by interested persons when the prescribed date for return of comments has expired.

In contrast to fixed-wing aircraft, rotorcraft have the unique ability to raise, lower, and transport external loads (for example, by means of a cable and hoist) and to tow objects on the surface. A considerable number of civil rotorcraft are now being used in such operations, and large "flying crane" helicopters are being designed.

While rotorcraft have been approved for use in the carriage of external cargo and the towing of objects on land or water surfaces in the restricted category under Part 8 of the Civil Air Regulations, this part does not permit the use of rotorcraft in operations for compensation or hire. Furthermore, approval under the standard certification requirements for rotorcraft in the configurations required for the carriage of all kinds of external cargo or for towing has not been accomplished primarily because of the difficulties encountered in showing full compliance with these requirements. Operations with external loads and the problems associated therewith were not considered at the time of the promulgation of either Part 6 or 7 of the Civil Air Regulations. Therefore, under the provisions of Parts 6 and 7 compliance with the numerous flight characteristics requirements in those parts would have to be demonstrated for each anticipated

external load configuration, resulting in a flight test program too burdensome and expensive to be considered by manufacturers of rotorcraft.

In view of the foregoing, the Agency considers it appropriate and in the public interest to permit a greater utilization of rotorcraft for the carriage of external cargo and towing under regulations which will insure that an adequate level of safety is maintained in such operations. Therefore, it is proposed to adopt a Special Civil Air Regulation containing provisions governing the approval of rotorcraft for use in the carriage of external cargo and in towing operations for compensation or hire and setting forth appropriate operating limitations applicable thereto.

The special regulation proposed herein establishes the specific requirements and operating limitations applicable to rotorcraft for which application has been made for the approval of such rotorcraft for use in operations involving the carriage of external cargo or the towing of objects on land or water surfaces. Such rotorcraft would be required to be certificated under Part 6 or 7 of the Civil Air Regulations. The rotorcraft would be limited to the certificated weights in operations conducted under the provisions of this regulation, except that a rotorcraft certificated under Category A of Part 7 could be approved for operation with a weight at which it could be shown to comply with the performance requirements of Category B of Part 7 and with the requirements of this regulation.

The applicant would define particular or representative external load weights and configurations for which he would be required to demonstrate compliance with specific strength and flight characteristics requirements. In addition, the proposed regulation would require demonstration that the rotorcraft is safely controllable while carrying the defined external loads. The results of these tests would be used to establish operating limitations for external loads, cargo configurations, weights, and airspeeds.

Since loads imposed during towing operations could exceed the loads imposed by the heaviest cargo that the rotorcraft is approved to carry, it is necessary to require that means be provided to avoid exceeding the load limitations of the rotorcraft. The direction at

which a tow-line load is applied may be critical. If such is the case, this limitation would also be established and observed.

Where necessary to enable a safe emergency landing to be accomplished, a means for jettisoning external cargo or releasing tow lines would be required.

Certain phases of external loads operations may entail more risk for the occupants of the rotorcraft than is encountered during normal operations, therefore, the proposed regulation would limit occupancy during such operations to the flight crew and personnel necessary to perform the operation.

To protect the general public, the proposal would prohibit operation over congested areas with a rotorcraft carrying an external load which could be released in flight, or dropped as a result of any single structural failure. However, when justified by circumstances, special authorization for specific operations over congested areas might be granted by the Administrator.

An amendment to the Rotorcraft Flight Manual or an approved manual for external load operations would be required to inform the flight crew of the operating limitations and other information essential for safe operation of the rotorcraft.

In consideration of the foregoing, it is proposed to promulgate the following Special Civil Air Regulation:

1. *Applicability.* This regulation prescribes the requirements for the approval and use of a rotorcraft, type certificated under Part 6 or 7 of the Civil Air Regulations, in the carriage of external cargo, or the towing of objects on land or water surfaces for compensation or hire. As used in this regulation, external cargo means the cargo carried outside of the fuselage structure of a rotorcraft, the term "sling or hoist load" means an external cargo suspended by a rope or cable attached to a shackle, hoist, or similar device which is attached to the rotorcraft, and "external load" means external cargo and towing loads.

2. *Application for approval.* Any person may apply for approval under the provisions of this regulation. The applications for approval shall be submitted to the Chief, Flight Standards Division, Federal Aviation Agency, of the Region in which the applicant is located and shall contain the information required in this regulation.

3. *Requirements for approval.* Rotorcraft may be approved for use in operations involving the carriage of external cargo or the towing of objects on land or water surfaces if:

(a) The applicant has submitted data establishing and has demonstrated that the rotorcraft complies with the requirements of sections 4 through 6 of this regulation; and

(b) The Administrator finds, upon the completion of all tests and inspections, that there is no feature, characteristic, or condition of the rotorcraft which would render it unsafe when operated in accordance with the operating limitations established in section 7 of this regulation.

4. *Flight characteristics requirements.* Compliance with the flight characteristics requirements of paragraph (c) of this section shall be demonstrated for all the load configurations and weights established in accordance with paragraphs (a) and (b) of this section.

(a) *Rotorcraft maximum weight and center of gravity limitations.* The applicant shall select the maximum weight and the center of gravity limitations for which approval for carriage of external cargo or towing operations is desired. The weight and center of gravity limitations selected shall not exceed those limitations established in the basic certification of the rotorcraft, except that, for rotorcraft certificated under Category A of Part 7 of the Civil Air Regulations, a weight may be selected at which the rotorcraft is shown to meet the performance requirements of Category B of Part 7.

(b) *External load weights and configurations.* The applicant shall select and define the external load configurations and weights for which approval is desired. If the applicant elects not to select a particular configuration of sling and hoist loads to be carried, he shall select one or more of the representative configurations set forth in subparagraphs (1) through (3) of this paragraph. The limitations and procedures established for operation with external loads shall be based upon the characteristics of the load configuration(s) selected.

(1) A load with three dimensions of similar magnitude, (high and/or low density bulky load).

(2) A load with one dimension no more than one-fifth of the smaller of the other two dimensions, (flat-type load).

(3) A load with the length at least twelve times the larger of the other two dimensions or twelve times the diameter if a cylindrical load is selected, (pole-type load).

(c) *Flight characteristics.*

(1) It shall be possible to maintain a flight condition and to make a smooth transition from one flight condition to another without requiring an exceptional degree of skill, alertness, or strength on the part of the pilot, and without danger of exceeding the limit load factor, under all conditions of operation probable for the type of operation, including those conditions normally encountered in the event of sudden powerplant failure.

(2) The rotorcraft shall be demonstrated to be capable of safe operation on or near the ground under normal operating conditions in a 20 m.p.h. wind blowing from any direction.

(3) For each external load configuration selected in accordance with paragraph (b) of this section the flight characteristics required in subparagraph (1) of this paragraph shall be demonstrated for a speed range from hovering flight to a speed ten percent greater than the maximum allowable speed established for such external load configuration.

5. *Design requirements.*

(a) The structure which supports the external load, including those portions of the airframe structure that are affected, and any mechanisms or devices which are used in the lifting and supporting of external loads shall comply with the applicable airworthiness requirements of Part 6 or 7 of the Civil Air Regulations.

(b) When external cargo that extends below the landing gear is carried by single-engine rotorcraft, or by multiengine rotorcraft that are not capable of continued hovering out of ground effect with one engine inoperative, or when an operation involving the raising or lowering by hoist or the dropping of cargo is being conducted with any rotorcraft, a means for jettisoning the cargo shall be provided. For towing operations, a means for releasing the tow line shall be provided. These means shall be demonstrated to function satisfactorily under the most critical loading condition, taking into account the direction of load application; and it shall be established that the cargo can be jettisoned in a manner such that it will not interfere with a one-engine-inoperative landing.

(c) When a means for jettisoning cargo or a tow-line release is required in compliance with paragraph (b) of this section, an emergency quick release control on the pilot's primary flight control or a manual mechanical emergency release readily accessible to the pilot shall be provided. This release control shall be clearly marked to indicate its purpose and method of operation.

(d) Means shall be provided to insure that during towing operations loading conditions on the rotorcraft which exceed the weight and center of gravity limits may be consistently avoided.

6. *Manual requirements.*

(a) An approved amendment to the Rotorcraft Flight Manual or an approved manual for operation with external cargo or for towing, listing the types of such operations for which the rotorcraft is approved, shall be prepared by the applicant and shall include:

(1) The operating limitations, procedures, performance information, loading conditions, approved weights, center of gravity and cargo configurations, method of attaching and carrying all approved load configurations, towing load limitations, tow cable

angle limitations, and information regarding possible critical configurations of load or manner of attaching the load; and

(2) A precautionary notice concerning hazards to personnel on the ground from static electricity.

(b) For the purpose of showing compliance with this regulation and during operations conducted in accordance with this regulation, the operating limitation established in compliance with § 7.741(f) of Part 7 of the Civil Air Regulations to outline the limiting heights and corresponding speeds for safe landing after power failure shall be classified as performance information.

7. *Operating limitations.* A rotorcraft approved under the provisions of this regulation for use in operations involving the carriage of external cargo or the towing of objects on land or water surfaces shall, when engaged in such operations, be operated in compliance with paragraphs (a) through (d) of this section.

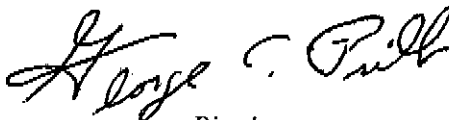
(a) Occupancy of the rotorcraft shall be limited to the flight crew and such personnel as are necessary to carry out the operations and a placard stating this limitation shall be installed in the cockpit and/or the cabin.

(b) Operation over congested areas, towns, or settlements, or an open air assembly of persons of a rotorcraft carrying an external cargo which can be released in flight or which can drop as the result of any single likely structural failure is prohibited unless specific authority for such operation has been issued by the Administrator.

(c) Rotorcraft shall be operated in accordance with the specific airspeed limits established for operation with external cargo or for towing and the airspeed indicator markings shall include such airspeeds or a placard displaying such limitations shall be located adjacent to the airspeed indicator.

(d) Rotorcraft shall be operated only with the external load configurations and weights for which the capability of the rotorcraft has been demonstrated in accordance with this regulation and which are set forth in the required manual.

This regulation is proposed under the authority of sections 313(a) and 601 of the Federal Aviation Act of 1958 (72 Stat. 752, 775; 49 U.S.C. 1354(a), 1421).



Director,  
Flight Standards Service.

Issued in Washington, D. C., on January 18, 1962.