REGULATIONS
Serial Number SR-379

UNITED STATES OF AMERICA
CIVIL AERONAUTICS BOARD
WASHINGTON, D. C.

Effective: January 31, 1952
Adopted: January 31, 1952

SPECIAL CIVIL AIR REGULATION

APPLICATION OF CERTAIN TRANSPORT CATEGORY PERFORMANCE REQUIREMENTS TO THE C-46 TYPE AIRCRAFT

IT APPEARING THAT:

1. On July 6, 1951, the Board issued a notice of Proposed Rule Making under which the standards applicable to the C-46 with respect to the maximum certificated weight for passenger operations would be modified.

2. Thereafter in the light of certain protests and requests for hearing as to the factual basis for the proposed rule, the Board instituted a proceeding on the matter of the modification of the requirements with respect to the weight of the C-46 in the interest of safety, and set it down for hearing before an Examiner; this proceeding is still pending before the Board, the Examiner's Report, containing his findings of fact but no recommended conclusions, having just been issued.

3. In the last 50 days there have been three accidents in common carrier operation involving C-46 aircraft; two of these accidents resulted in the loss of 82 lives.

4. The occurrence of these accidents has resulted in the Board's institution of formal investigations to determine the causes of such accidents and informal investigations concerning the safety of operations and maintenance practices and procedures of the specific carriers concerned in the accidents.

5. Preliminary data obtained from the formal and informal investigations and from other sources of information available to the Board, have indicated an apparent laxness in operating practices and procedures followed by the carriers investigated in some or in all of the following aspects:

(a) Failure to maintain pilot training and proficiency at a desirably high level;

(b) Failure to ensure aircraft and engine maintenance at a desirably high level; and

(c) Failure on the part of the companies and their personnel to follow certain operating procedures established in accordance with the Civil Air Regulations, including those pertaining to maximum operating weights.

6. The accident record of the C-46 aircraft in irregular carrier operation since 1947 shows 39 accidents. Seven involved the loss of power of one engine,

24 the factor of pilot error, and 9 the failure on the part of other personnel including maintenance personnel.

Five of the seven accidents involving loss of one engine occurred on take-off, and all five of such accidents at least partially resulted from inadequate maintenance. In the sixth case, one engine failed in cruising flight, and soon thereafter the other failed necessitating a forced landing in the ocean. In the seventh case, fire in one engine occurred during normal flight necessitating an emergency landing.

According to best estimates, the irregular carriers operated 32,598,000 C-46 plane miles during 1950-51 with the rate of 6.4 accidents per 10 million plane miles. The Board regards this rate as being unnecessarily high and not in line with the accident rates on other aircraft.

7. The Civil Air Regulations currently provide two general standards for airworthiness - the Normal category (Part 3) and the Transport category (Parts 4a, 4b). The DC-3 and the Lockheed 18 were both introduced into service prior to the time the transport category requirements were adopted, and consequently are not certificated under these standards. However, both these airplanes will at sea level meet and even exceed the performance requirements of Part 4b. The C-46 was certificated under Part 3 of the Civil Air Regulations and cannot comply with the take-off performance requirements of the transport category at the maximum certificated weight at which it is now operated (see Examiner's Report, Docket No. 5107, p. 11, f.n. 9). Thus, the C-46 is the only large multi-engine aircraft in general passenger use which at sea level will not comply with the take-off performance requirements of Part 4b, at the maximum certificated weight at which it is operated, i.e., 48,000 pounds.

8. The provision in Part 4b of the Civil Air Regulations for transport category aircraft which performance-wise would, if applied, constitute the effective limit of the maximum certificated take-off weight of the C-46 is that which requires the single-engine rate of climb, in the take-off configuration with the landing gear retracted and the inoperative propeller windmilling, to be not less than $0.035\ V_{s1}{}^2$; where V_{s1} is the established stalling speed in the pertinent configuration. In determining the maximum take-off weights under the Transport category, it is assumed that (1) the foregoing configuration will be encountered shortly after a take-off during which one engine fails at the most critical point during the ground run and the pilot continues the take-off, and (2) that the pilot will not start to feather the propeller until a height of 50 feet is reached.

ON THE BASIS OF THE FOREGOING and recognizing that safety in the air is accomplished not by any single means, but by constant attention to the improvement of maintenance and of operating practices and procedures, by constant attention to the development of greater pilot skill and proficiency and by development of appropriate standards for the performance of aircraft, and further recognizing that many accidents are caused, not by a single factor but by a combination of circumstances which may embrace any or all of the foregoing factors, the Board is of the opinion and finds that in the case of the C-46 aircraft, an emergency exists which requires that immediate action should be taken to apply to this aircraft standards of performance more nearly comparable to those met by other aircraft used in passenger service which will necessarily result in lowering the maximum weight of this aircraft, thus providing a further

margin of safety. In so doing the Board recognizes that the present accident record of the C-46 aircraft does not demonstrate conclusively that any single accident is entirely the result of the weight factor, but has in mind the truism that the lighter the total weight of the aircraft, the higher its operating performance can be expected to be and the easier it will be to fly safely. The Board in making its present determination is acting only upon the present state of facts and without prejudice to a determination as to what the ultimate standards for determining the maximum weight of the aircraft should be.

The Board's action is designed to increase the safety factor for the interim period which will be necessary before the Board can finally decide all of the various questions involved in this problem and before such program as may be found necessary can be fully implemented. It is anticipated that the Board in conjunction with the Administrator of Civil Aeronautics will proceed with its efforts to arrive at a conclusion as to the proper safety rules under which the C-46 aircraft is to be operated in passenger service on a continuing basis and that the maintenance and operating practices and procedures of the operators of the C-46 aircraft will be more strictly supervised and examined.

The Board, in a Notice of Proposed Rule Making to be published concurrently with the issuance of this regulation, proposes to examine the question whether it is necessary in the interest of safety to apply, on a permanent basis, the Part 4b performance requirements, with the exception of those applicable to the second segment of the take-off climb, to C-46 aircraft operated for the carriage of passengers for remuneration or hire. In the interim, and pending the accomplishment of the foregoing, which cannot be completed soon enough to obviate the necessity for this emergency regulation, it is the Board's intention to require immediately that any C-46 operated in passenger-carrying service be limited to a maximum weight of 45,000 pounds. This weight was determined substantially in accordance with the take-off performance requirements of the transport category, but with the aircraft permitted to meet the second segment rate of climb requirement as though it were in the third segment configuration, i.e., the propeller feathered, and with no further weight reduction for airport elevations.

The precise maximum weight at which the C-46 aircraft will meet the standards which the Board desires to impose cannot be definitely ascertained at this time since uncontested data are not available. In his report, the Examiner mentions the weight of 45,400, 44,300, and 43,600 lbs., as possible weights at which the standards mentioned above would be met, depending upon what data are relied on. As an interim measure the Board has decided to use a value of 45,000 lbs. While it is realized that this value is not an exact one in an engineering sense, the Board believes it to be a fair one. As this is a value to be used only during the interim period, the Board does not intend to propose different values to account for the differences between the C-46 E and F models, or between the aircraft equipped with the Hamilton Standard and Curtiss propellers. The limitations imposed herein are in addition to those already in effect, and this action in no way authorizes operation of C-46 aircraft in excess of maximum weights already established pursuant to other existing requirements.

Temporarily, at least, the Board intends to permit the irregular operators to continue to operate their C-46 aircraft under the nontransport category operating limitations of Part 42 of the Civil Air Regulations, namely §§ 42.80 - 42.83. It is believed that the application of these operating rules to the C-46 has resulted in increased safety and that they are adequate for the present. The

Board is currently considering this entire matter further and may propose modifications to these operating rules which would be applicable to the C-46 and other nontransport category aircraft at a later date. The Board intends to apply this modified transport category requirement only to aircraft being operated in passenger service and it is proposed, therefore, that all C-46 aircraft used in cargo service, at least for the present, continue to be operated at the weights determined in accordance with the existing standards applicable to such aircraft.

In reaching the determination on an emergency temporary basis to apply standards which will lower the maximum weight of the C-46 aircraft in passenger service, the Board is not unmindful that there will be certain economic effects on the carriers who operate this aircraft in passenger service. However, the weight at which the Board has determined the aircraft should be flown pending final disposition of the matter is approximately the weight at which some of the C-46 aircraft are already being operated in passenger service by a number of irregular carriers and the Board's action herein will not prevent the continued operation of the aircraft carrying substantial traffic loads. Furthermore, the operation of the C-46 over shorter distances will make it possible to minimize the loss of passenger-carrying capacity which is now figured on the basis of fairly long-range operations. In any event, the Board finds that such economic losses as may accrue to the operators of the C-46 in passenger service as a result of the Board's action are more than outweighed by the additional safety sought to be accomplished.

In view of the foregoing, the Board is of the opinion that an emergency requiring immediate action exists in respect of safety in air commerce, that notice and public procedure hereon are impracticable and that the following Special Civil Air Regulation is required in the interest of safety.

In order that an appropriate basis for final rule-making action with respect to the performance standards to be met by the C-46 aircraft operated for the transportation of passengers by irregular carriers may be fully explored, the Board is issuing concurrently herewith a Notice of Proposed Rule-Making proposing performance standards consistent with the interim action taken herein, as a possible alternative to the proposal issued on July 6, 1951, which based the ultimate take-off weight upon a zero rate of climb in the take-off configuration. The Board will receive written comments and will hear oral argument on such notice, at the same time as oral argument is heard in the C-46 investigation referred to in paragraph 2 of this Special Regulation.

Accordingly, the Civil Aeronautics Board hereby makes and promulgates a Special Civil Air Regulation effective immediately until further order of the Board, to read as follows:

> "After 12:01 A.M. Eastern Standard time February 3, 1952 all C-46 type aircraft used for the carriage of passengers for remuneration or hire shall be limited not to exceed a maximum take-off and landing weight of 45,000 lbs."

(Sec. 205(a), 52 Stat. 984; 49 U.S.C. 425(a). Interpret or apply

Secs. 601, 1005, 54 Stat. 1007, 1023; 49 U.S.C. 551, 645.)

By the Civil Aeronautics Board:

/s/ M. C. Mulligan

(SEAL)

M. C. Mulligan
Secretary

MEMBERS LEE AND ADAMS, DISSENTING:

We dissent because the regulation would not have prevented any of the accidents relied upon by the majority as justification for this emergency action. Overweight was not the probable cause in any of the accidents referred to. The Board has conducted lengthy hearings on the gross weight of the C-46. The examiner's report has been released and in the very near future the Board will have the opportunity to pass upon this question, after all parties have been heard and all facts carefully examined.

/s/ JOSH LEE
/s/ JOSEPH P. ADAMS