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

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SPECIAL CIVIL AIR REGULATION

FUEL RESERVES FOR MULTIENGINE TURBINE-POWERED AIRPLANES

Section 41.98 of Part 41 of the Civil Air Regulations currently prescribes the fuel supply requirements for scheduled air carrier operations outside the continental limits of the United States. These requirements have been substantially unchanged since 1945 and were designed to be applicable to airplanes powered with reciprocating engines.

The Board, as well as interested industry groups, has recognized the need to re-examine the current fuel reserve requirements in the light of the approaching widespread use of turbine-powered airplanes. After careful study of this problem, Civil Air Regulations Draft Release No. 57-31 was circulated on December 30, 1957, for comment on the proposed amendments to fuel requirements for both reciprocating engine and turbine-powered airplanes. Since strong views were expressed both for and against the proposals, it was deemed advisable to defer action on these proposals, and in particular on those pertaining to turbine-powered airplanes, pending the accumulation of operational experience with these airplanes. Aircraft certification data, service tests, and proving flights of turbine-powered airplanes now provide fuel consumption and fuel reserve data for the preliminary determination of reasonable minimum standards for fuel supply requirements.

In addition, the provisional certification provisions of Special Civil Air Regulation No. SR-425, effective June 20, 1958, enabled one air carrier to gain considerable operational experience on fuel management prior to full CAA certification. This experience and the supporting data were carefully analyzed and were of great assistance in formulating the standards prescribed in this special regulation.

While the Board is of the opinion that additional operational experience with turbine-powered airplanes is desirable in the development of fuel requirements, it considers that the operational data currently available provide a good basis for establishing interim fuel supply requirements for jet airplanes. After the accumulation of additional information on the adequacy of these requirements, firm standards will be prescribed in the specific operating parts of the Civil Air Regulations.

In examining the comments received on Draft Release 57-31, it became apparent that the payload penalty in carrying fuel in excess of the minimum required for safety in turbine-powered airplanes is much more severe than for reciprocating-powered airplanes. Runway lengths are often too short to permit maximum gross take-off weights. Noise reduction techniques also have limited the choice of runways, which often make the longest and operationally most desirable runways unavailable. Based on present calculations, it has been determined that fuel requirements over and above those required for safety can in some cases make operations economically not feasible.

In establishing these interim fuel requirements, the Board has taken into consideration the significant difference in speed between jet and conventional airplanes, improved flight planning procedures, and the improvements in navigational facilities and instrument approach techniques since the establishment of the fuel reserve requirements in 1945. Because of increased speeds, weather forecasts for the destination will be more reliable and the improvements in flight planning procedures as well as navigational facilities and instrument approach techniques give greater assurance that landings will be completed at those destinations.

In considering the fuel reserve necessary for dispatching a jet airplane to a destination without an available alternate, several factors must be considered. Admittedly, the weather does not change any less rapidly at the destination merely with a change of equipment. However, since the jet is much faster, the weather forecasts for such destination are more accurate because the forecast period involved is shorter. This has the effect of reducing the interval between the estimated time of arrival at destination and the time at which the decision must be made to return to the point of take-off or to divert to another destination. "Spot" weather can thus often be used in addition to forecast weather for determining weather

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conditions at destination. Since the jet airplane is some 40 percent faster, a reduction in fuel reserves in such cases from three hours to two hours is reasonable.

Although Draft Release 57-31 proposed changes in the fuel reserve requirements of Parts 40, 41, and 42, this special regulation limits changes to turbine-powered airplanes operating under Part 41 since new fuel management experience has been gained only on these operations. Changes in the other requirements will be made as appropriate.

Interested persons have been afforded an opportunity to participate in the making of this regulation, and due consideration has been given to all relevant matter presented (23 F.R. 169). Because of the imminence of operations of turbine-powered transport airplanes in scheduled air carrier operations, the Board finds that it would be contrary to the public interest not to have appropriate fuel reserve requirements for these operations and that good cause exists for making this regulation effective on less than 30 days' notice.

In consideration of the foregoing, the Civil Aeronautics Board hereby makes and promulgates the following Special Civil Air Regulation, effective October 23, 1958.

Contrary provisions of § 41.98 of Part 41 of the Civil Air Regulations notwithstanding, a turbine-powered aircraft (exclusive of turbo-propeller powered aircraft) may be dispatched or take off only if it carries sufficient fuel, considering the wind and other weather conditions expected, to fly to the next point of landing specified in the clearance; and thereafter (1) to fly for a period equal to 10 percent of the total time required to fly from the point of dispatch to the next point of landing specified in the clearance; and thereafter (2) to fly to and land at the most distant alternate airport designated for that point in the clearance; and thereafter (3) to fly for a period of 30 minutes at holding speed at 1,500 feet above the alternate airport elevation under standard temperature conditions. In the case of a route approved without an available alternate for a particular stop, an aircraft dispatched to that point must carry sufficient fuel, considering wind and other weather conditions expected, to fly to that point and thereafter at least 2 hours at normal cruise consumption. The Administrator may require fuel in excess of any of the minimums specified in this paragraph when he finds that additional fuel is necessary on a particular route in the interest of safety.

This Special Civil Air Regulation shall terminate October 23, 1959 unless sooner superseded or rescinded by the Board.

(Sec. 205, 52 Stat. 984; 49 U.S.C. 425. Interpret or apply sec. 601, 52 Stat. 1007, as amended, 49 U.S.C. 551)

By the Civil Aeronautics Board:

/s/ Mabel McCart

Mabel McCart
Acting Secretary

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