

TM 55-1510-208-10

ARMY MODEL T-42A AIRCRAFT (BEECH MODEL B55B)



OPERATORS MANUAL

STALL WARNING INDICATOR

As an impending stall is approached, a stall warning indicator triggered by a sensing vane in the left wing sounds a warning horn while there is ample time for the pilot to correct his attitude. The warning is equally effective in all flight attitudes and at all weights and air-speeds. The warning signal will be irregular and intermittent at first and will become steady as the airplane approaches a complete stall.

Airspeed Charts

TAKE-OFF SPEEDS (5100 LBS.)

Normal

Take-off 82.5 kts

Short Field

Take-off 69.5 kts

CLIMB SPEEDS

Two Engine

Cruising climb speed
(gear and flaps up) 139.0 kts

Best rate of climb speed, 5000 ft.
(gear and flaps up) 102.5 kts
(gear down) 89.5 kts
(gear and flaps down) 79.0 kts

Best angle of climb speed, 5000 ft.
(gear and flaps up) 83.0 kts
(gear down) 78.0 kts
(gear and flaps down) 70.0 kts

Single Engine

Best rate of climb speed, sea level
(gear and flaps up) 100.0 kts

Best angle of climb speed, sea level
(gear and flaps up) 90.0 kts

Minimum control speed 80.0 kts

STALL SPEEDS

GROSS WEIGHT 5100 LB	LEVEL 	15° 	30° 	45° 
POWER				
GEAR AND FLAPS UP				
*ON	59.5 KTS	60.5 KTS	64.0 KTS	71.0 KTS
OFF	73.5 KTS	75.0 KTS	79.0 KTS	88.0 KTS
*ON	51.0 KTS	52.0 KTS	54.5 KTS	60.5 KTS
OFF	66.5 KTS	68.0 KTS	71.5 KTS	79.0 KTS
26.0" Hg AND 2625 RPM				

LANDING SPEEDS

Normal

Approach 88.0 kts
Contact 75.0 kts

Short Field

Approach 78.0 kts
Contact 68.0 kts

AIRSPEED LIMITATIONS

Never exceed (Glide or Dive, smooth air)

(Red Radial) 223 kts

Caution Range (Yellow Arc) 192 kts to 223 kts

Design Cruising Speed (Level Flight or Climb) 182 kts

Normal Operating Range

(Green Arc) 76 kts to 182 kts

Flap Operating Range (White Arc) 68 kts to 122 kts

Maximum Design Maneuvering Speed 156 kts

Maximum Gear Extended Speed 143 kts

Maximum Turbulent Air Penetration Speed 148 kts

reset for an economy mixture. (This is the lower portion of the fuel pressure range specified for the power being used.)

3. When an economy setting (Step 2) is in use and a change in power is to be made, it is recommended that the mixture control be returned by gage to approximately best power setting before changing the throttle or propeller setting.

The fuel selector valves may be positioned to use fuel as desired while normal cruising operations are continued. However, since your take-offs, climbs and landings must be made using the main fuel cells only, a sufficient reserve for a safe landing at your destination must be maintained. Providing the length of a flight will allow enough fuel for this reserve, the main cells only may be used for this operation. Otherwise, you should switch to the auxiliary fuel cells when you have established your cruising altitude. Also remember that the auxiliary fuel and crossfeed systems may be used in level flight only. When one selector valve is positioned on crossfeed, both engines are using fuel from a cell indicated by the remaining selector valve. Normal operation allows fuel to be consumed from the cell as indicated by the fuel selector valves.

Normal cruise control should be used for all flying when weather and distance are well within the normal operating limitations of the airplane and its pilot. The power settings used, however, will be governed basically by the objective of the flight — high speed, economy, or comfort. In general your climb operation should not exceed 80% power. Level flight cruise operations should be at the lowest power that will satisfy the speed requirements. Observing these limits will normally result in the optimum balance between airplane performance and over-all operation economy.

Cruise control for maximum range differs from that for maximum endurance chiefly in the airspeeds used. Range increases with increased airspeed due to the improvement in aerodynamic efficiency until the speed reaches a point where the increased drag and the proportionally higher fuel requirements of the engines begin to offset the aerodynamic improvement. Conversely, a speed below this point also will result in fewer miles per gallon and longer flight time, due to

MANEUVERS

The T-42A airplane is intended for only nonaerobatic passenger and cargo operation. Only those maneuvers incidental to NORMAL flying include stalls (except whip stalls) and turns in which the angle of bank does not exceed 60° are permitted. Refer to Section III for maneuver and stall speeds.

During a normal stall approach, a slight buffeting will provide a sufficient warning to permit a normal recovery; the severity of this warning will increase slightly with power on. In addition, the stall warning indicator gives aural indication of an impending stall approximately five to ten mph above the actual stall.

If a spin is entered inadvertently, cut the power on both engines. Apply full rudder opposite the direction of rotation and then move elevator forward until rotation stops. When the controls are fully effective, bring the nose up smoothly to a level flight attitude. Don't pull out too abruptly.

Speed is picked up rapidly in a nose-low attitude. Speed should be carefully controlled, especially if a "red line" speed is approached or rough air encountered unexpectedly. During a pull-out be aware of the amount of control pressure you must use to complete a safe recovery in the altitude you have available, and the load you can apply to the structure in a pull-out. Avoid any abrupt maneuvering or sudden application of the controls during this "red line" condition.

DESCENT

Your preflight planning should have determined the procedure you intend to use. Generally a slow cruising descent starting well out from your destination is more comfortable and with the higher cruising speed attained during the shallow descent with reduced power settings, an over-all saving in fuel will result. Adverse weather, however, if encountered at these lowering altitudes might nullify these advantages and make a sharp rate of descent more profitable; therefore, pilot preference and weather will determine the rate of descent.

Throughout descent watch your engine temperatures and regulate the cowl flaps accordingly, since temperatures may go below a safe mini-

SECTION V

Emergency Operating Procedures

“The best time to know procedures and the worst time to practice them is during an emergency.”

Emergencies created by the failure or malfunction of one or more components or accessories may be broadly classified in one of two groups: those requiring immediate action and those in which you have sufficient time to decide on and execute a plan of action according to the demands of the particular situation.

In this discussion of emergencies the situations requiring immediate corrective action are treated in check list style for easy reference and familiarization. Other situations are discussed with respect to cause, condition, effect, and possible corrective measures. Your practice of these suggested techniques should be frequent enough for you to maintain proficiency in the rapid initiation of the proper procedures. Complete mastering of the emergency procedures peculiar to multi-engine flying can not be overly stressed.

Emergency situations seldom will occur if you follow good inspection and maintenance practices; otherwise, your need for a complete understanding of this section is multiplied.

SINGLE-ENGINE OPERATION

The flight and handling characteristics of the T-42A on one engine are excellent. The airplane may be safely maneuvered or trimmed for normal hands-off operation, which is easily sustained by the operative engine as long as *sufficient airspeed is maintained*. However, to properly use these safety and performance characteristics, you must have sound understanding of single-engine performance and the limitations resulting from an unbalance of power.

Two major factors govern the single-engine operation; airspeed and directional control. The minimum single-engine control speed is the

speed at which you still have directional control with the aircraft in take-off configuration, one engine inoperative and full take-off power on the operating engine. However, bear in mind that this speed is a minimum for control and *below the speed at which the airplane will climb*.

The best single-engine rate-of-climb speed at sea level is indicated by the blue line on the airspeed indicator. This speed is extremely important for best performance in an emergency. In fact, it is probably the most important speed you will be concerned with during your practice of emergency procedures or should an actual emergency occur. If the best single-engine rate-of-climb speed is allowed to vary from the optimum, your rate of climb will decrease, or if you are above the critical single-engine altitude, your rate of sink will increase.

If you have best single-engine rate-of-climb speed, normal single-engine procedures may be followed. Otherwise, you must attain this necessary airspeed through acceleration or altitude loss. If this is not possible, it will be necessary to land. The technique to be used in a given situation and the decisions you must make will depend entirely upon your altitude and airspeed at the particular time the emergency arises. The variation in best rate-of-climb speed with altitude is shown in the graphs in Section VI.

Airspeeds given in Section III and Section VI are recommended for average piloting techniques, under average conditions; they do not represent the maximum airplane performance under ideal conditions, but have been determined on the basis of actual flight tests to afford you with a reasonable margin of safety.

The chief advantage of an additional engine is the ability of the airplane to go on flying if one engine fails. However, having two engines, like having blind flying instruments, is a safety factor which depends on the knowledge, technique and the recent experience of the pilot in his particular airplane.

A zero-thrust graph with instructions for simulated one-engine-out conditions is provided to aid in reduction of risks involved in single-engine practice. Practice these techniques until they become instinctive.

SIMULATED ONE ENGINE OUT PROCEDURE

Simulated one-engine-out conditions may be set up whereby zero thrust power settings may be used instead of complete engine shut-down in order to avoid the risks involved in the training or practice of single-engine technique. The three airspeeds represented in the accompanying graphs are V_{mc} (minimum single-engine control speed), V_x (best single-engine angle-of-climb speed), and V_y (best single-engine rate-of-climb speed) with the landing gear up and the propeller feathered. In order to set up a zero thrust condition for single-engine practice, use the following procedure:

Use of the Zero Thrust Graph

1. Select your pressure altitude (altimeter set at 29.92 inches Hg) and either the V_{mc} , V_x or V_y airspeed.
2. Observe the OAT and determine the standard altitude from the altitude conversion chart.

ENGINE SPEED FOR ZERO THRUST

