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AIRCRAFT PROFILES

Boeing/Stearman Model 75

Written by Tom Lowe

AIRCRAFT DESCRIPTION

The Boeing/Stearman Model 75 primary trainer is probably the best known bi-plane in aviation history. Commonly referred to as the Stearman PT-17, it was manufactured by the Stearman Aircraft Company in Wichita, Kansas from 1934 through 1945. Boeing publicity claims a total of 10,346 Stearman "Kaydet" trainers built, but this figure includes equivalent spare parts. The actual total of Model 75's that were completed from the prototype X-75 to the final E75 built in 1945 was 8,428.

In 1938 the Stearman Aircraft Company became the Stearman Aircraft Division of the Boeing Aircraft Company so in actuality, the majority of the airplanes manufactured were designated as Boeings. However, they are still almost universally known as Stearmans.

Generally, all the Stearman airframes built are the same with the only major difference being the engine installed. Original engines included the Lycoming R-680 (225 hp); Continental R-670 (220 hp) and the Jacobs R-755 (225 hp). Post-war modifications include the Lycoming R-680 (300 hp); Pratt & Whitney R-985 (450 hp) and the Jacobs R-775 (275 hp). The propellers generally in use on Stearmans are the Sensenich wooden prop; the ground adjustable McCauley steel blade prop and the fixed pitch Hamilton Standard propeller.

The Stearmans manufactured for the U.S. Army Air Corps were the PT-13; PT-13A; PT-13B; PT-17; PT-18; PT-27 and PT-13D. The U.S. Navy airplanes were the N2S-1;-2;-3;-4 and-5. The primary difference between the Army and Navy airplanes, other than engines installed, was the tail wheel. Army airplanes had a fully steerable tail wheel while the Navy airplanes were equipped with a full swivel type with a lock. Most Stearmans today have subsequently been modified with the steerable tail wheel. The final version of the Stearman was the E75, designated PT-13D/N2S-5. It was the only complete standardization of an Army and Navy production design during WWII and was totally the same for both services.

Post-war civil requirements for surplus military Stearmans is covered by Aircraft Specification A-743. This document lists all the approved equipment allowed on a standard category Stearman and the items that must have been removed, replaced or modified when the military surplus Stearman was first licensed as a civilian airplane. Over the years there have been many models and STC's for the Stearman Series. The Stearman makes an outstanding and fun civilian aircraft. The owners enjoy fly-ins, airshows, formation flying and a variety of activities.

BASIC SPECIFICATIONS

Boeing/Stearman Model 75	
Gross weight:	2950 lbs.
Maximum Baggage	60 lbs.
Fuel:	46 gal. (gravity feed, 4-7 gal not available in flight)
Oil:	4.4 gal.
Power Off Stall Speed:	55 mph (48 kts)
Power On Stall Speed	51 mph (44 kts)
Do not exceed speed:	186 mph (163 kts)
Normal Cruise Speed:	95 mph (83 kts)
Fuel consumption:	12-13 gal./hour
Endurance:	3.4 hours (approx.) most pilots plan 2.5 hrs
Maximum Range:	300 sm (260 nm, no reserve, most pilots plan 200 sm)
Service Ceiling:	13,300 ft.
Initial Rate of Climb:	800 ft./min.
Take-Off Distance:	600 ft.
Landing Distance:	300-500 ft.

PERMISSABLE ACROBATICS

Spins
Inside Loops
Snap Rolls under 106 mph (92 kts)
Slow Rolls under 124 mph (108 kts)
Immelmann Turns
Inverted Flight
Inverted Spins

STEARMAN MODEL 75 DESIGNATIONS

Model	Military Designation	Engine
75	PT-13	Lycoming R-680-5
A75	PT-13A	Lycoming R-680-7
A75	PT-13B	Lycoming R-680-11
A75B4	N/A to Venezuela	
A75J1	PT-18	Jacobs R-755
A75L3 and A75L5	N/A to various foreign countries	
A75N1	PT-17	Continental R-670-4 & -5
A75N1	N2S-1	Continental R-670-4
A75N1	N2S-2	Lycoming R-680-8
A75N1	N2S-4	Continental R-670-4 & -5
B75	N2S-2	Lycoming R-680-8
B75N1	N2S-3	Continental R-670-4
D75N1	PT-27 to Canada	Continental R-670
E75	PT-13D/N2S-5	Lycoming R-680-17

Engine note: It was required that all Continental R-670 engines, when transferred to civilian use, be re-designated and have the engine identification plate changed to show the civilian designation.

Continental Engines

Military Designation	Civilian Designation
R-670-5	W670-6A
R670-4, -11A	W670-6N
R-680-8	W670-17

AIRWORTHINESS DIRECTIVES

Airframe

The Boeing/Stearman Model 75 has had five Airworthiness Directives issued for it. Only two of these apply to the stock airplane while the other three apply to agricultural duster/sprayer airplanes.

A.D. 46-24-01
Due to inadequate drainage forward of the ailerons, water drain holes must be drilled in the dural angle forming the lower rear edge of the wing at the aileron gap.

A.D. 50-06-02
Upon initial certification as a civilian aircraft and at each subsequent annual inspection the fuel tank in the center section must be removed and the spars inspected for moisture damage. The drain holes must be ascertained to be open.

Repeated removal of the fuel tank is not required if after the initial inspection of the center section the gap between the fuel tank ad the upper surface of the center section is sealed by doping on fabric to prevent moisture from entering the fuel tank compartment.

Propellers

A.D. 54-12-02
McCauley steel blade propeller Models 41D5926 and D-1093. Each 100 hours of operation a magnetic (magnaflux) inspection of hub and blade shanks for cracks must be completed. Aircraft tachometer must be placarded "Avoid continuous operations at 1500 to 1650 rpm."

A.D. 50-12-1
Hamilton Standard Model 5404. Blades Model 11C1 (Navy 4350, 4350F, 4350F1)

To minimize the possibility of propeller blade shank fatigue failures as a result of noncompliance with a mandatory engine operation restriction, the following precautionary measures should be taken:

1. Check the marking on the engine tachometer and correctly mark it, if necessary, with a red arc which covers the entire rpm range above 1900 rpm.
2. Install placard in aircraft to read: "Avoid all engine operations above 1900 rpm except during takeoff."
3. Check position of the propeller and correctly index, if necessary, in the zero degree position (blades in line with crank throw).

REFERENCE MATERIAL

Stearman Restorers Association
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Chino, CA 91710-8800
E-mail: Davco@stearman.net
SRA web site: www.stearman.net

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Web site: www.stearmanflyin.com

National Stearman Fly-In held annually the first week of September beginning on Labor Day.

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