

Dragonfly Information

No no ...not a bi-plane!

Description

I found this on the Dragonflylist. It says it all!

"The Dragonfly is a low-cost, homebuilt sport plane with a canard planform. The canard design provides low wing loading to produce exciting performance with a wide variety of engines and brings the added plus of exceptional stall resistance.

You can pick from three different landing gear configurations:

The original Mark I (MK I) is best suited for paved runways and wide taxiways, due to its wide wheel spacing.

The Mark II (MK II) was designed to allow builders to fly from narrow runways and grass strips. It would be suitable for operation from any field that would be used by factory built aircraft.

Although not an official designation of the designer, there is a variant of the MK II that is known as the MK IIH due to its hoop style landing gear. The landing gear may be made of composite materials or aluminum.

The final aircraft in the Dragonfly family is the Mark III (MK III) which has a tricycle landing gear configuration. It was designed to retain all the good looks of the Dragonfly while offering excellent ground handling and easy landing characteristics."

Thanks, Jeff LeTempt, to let me use this text.

When you look at this drawing, you clearly see that it looks like the Quickie. Call it a copy of the Quickie? Euh ... I think that the concept is the same, but the total design is different. First, the Dragonfly appeared BEFORE the Q2. So..., Bob Walters, the designer, could not have copied the Q2. And when you compare the wings you will see that the Dragonfly has larger wings. 97 sq. ft for the Dragonfly, 67 sq. ft for the Q2. The Dragonfly has a wing loading that is 30% less than that of the Q2. Later I will discuss the differences some more in detail. Lets first see some history.

The Dragonfly made its maiden flight on 16 June 1980 near San Diego. Bob Walters was flying the machine. One month later it was presented at Oshkosh after a total flight of 14 hours with a average speed of 225 km/h and a consumption of 5,5 litres/100 km. it got the award "Outstanding New Design". Back home, Bob was drowning in request to buy Dragonfly plans. He sold plans for several months. But he sold the license to the firm HAPI (with Rex Taylor as president) after he found a new job as airliner pilot. HAPI did what Bob Walters didn't want to do. They changed the plans to the demands of the customers. I found out about three versions. Mk I, version with

wheels in the wing tips. Mk II, having a straight front wing and a classic landing gear under the wings. Mk III, a trigear (one wheel in the nose and two at the middle of the airplane). Another change was that the windscreen opened forwards. the prototype had a sideways opening windscreen. the change was made to allow access to the cockpit from both sides.

What amazed me was the data regarding glide-ratio (how good it glides without power). Normaly one does not mention it when describing a light motorized airplane. Here they did. 14,5! Outstanding for a airplane of its kind. There is yet another Dragonfly landing gear. It is known under the designation Mk II H. You can recognize it by its bended shape.

I got this info about it from Dave Morris:

"The reasons for the hoop gear are:

1. Simpler, 1-piece construction, all fiberglass
2. Attaches to fuselage, not canard, so
 1. no cutting on canard
 2. drop canard while aircraft sits on gear
3. Raises fuselage several inches higher off ground for better prop clearance

The IIH was designed after the II."

Rich added on this info on the Dragonflylist:

"The IIH can raise the nose if desired.

I can't remember if the H came after or before the wing socketed variation. It was, however quite early in the development. The originator of the idea was Gene DeVincenzo.

One additional benefit is that the landing forces are shunted to the fuselage rather than the spar, and being a hoop, the absorption of less than perfect landings are absorbed by the gear splaying out and then gently returning, rather than bending backward. (ALA Rutan with the EZs.)"

Now back to the design talk. The Dragonfly had problems with its Mk I version.

Owen Strawn gives me this remark:

"The only reason I know for putting the wheels on the ends of the canard is that the original Quickie was a very marginally powered design, and this configuration reduced

the total weight and the drag of the airplane. This didn't work as well for the Dragonfly, because the canard span is so much greater and the airplane so much heavier that the "springiness" is a much more significant concern. Many MK I Dragonflies ended up with broken canards because of bouncing, which is why the inboard gear was designed (MK II). The Q2/200 has a somewhat smaller canard span and has not had as much problems with this issue."

In the old days the plans and so of the Dragonfly are sold by Slip Stream Industries. Their site is non-active. Who sells that material now?

Specifications of Dragonfly according to Slip Stream Industries

OVERALL

Span	22.0 ft.
Length	19.0 ft.
Height-Level	5.5 ft.
Height-Ground	3.5 ft.
FUSELAGE	
Seats	2
Frontal Area	9.5 sq. ft.
Cockpit Width	43.0 in.
Cockpit Height	31.0 in.

PERFORMANCE

VNE	180 m.p.h.
Vc 75% Power	165 m.p.h.
Va	120 m.p.h.
Vs	48 m.p.h.
Rate of Climb	850 f.p.m.
Service Ceiling	18500 ft.
Takeoff, 50 ft. obs	1200 ft.
Landing, 50 ft. ob	2000 ft.
Range, 75% pow	500 mi.
Fuel Capacity	15.0 gal.
Wing Loading	11.4 lb./sq. ft.
Power Loading	19.2 lb/hp
G load +	4.4
G load -	2.0

WEIGHTS

Gross	1150 lb.
Payload	545 lb.
Baggage Limit	20/70 lb.
WING	
Span	22.0 ft.

Area	45.6 sq. ft.
Aspect Ratio	10.6
Chord-Root	30.0 in.
Chord-Tip	20.0 in.
CG Fwd.	58.7 in*
CG Aft	63.5 in.

AILERONS (each)

Span	128.0 in.
Area	6.3 sq. ft.
Def-Up	18.0 deg.
Def-Down	18.0 deg.
Type	Plain

CANARD

Span	22.0 ft.
Stab Area	46.6 sq.ft.
Elevator Area	8.8 sq. ft.
Def-Up	10.0 deg.
Def-Down	22.0 deg.
Incidence	0.0 deg.

TAIL (vertical)

Span at Rudder:	3.0 ft.
Stab. Area	.2 sq. ft.
Rudder Area	2.0 sq. ft.
Deflection	32.0 deg.

POWERPLANT

Make	VW (mod)
HP	60
Max RPM	3200
Max Torque	98.5 lb-ft.
Fuel Quality	100 LL

I got this remark from Jeffrey Letempt: "If it were me I would change a few thing on your web site about the specifications. First of all the original MK-I had a 20' canard span. Second is that I would say there are very few newly built Dragonflys that use the 60 HP VW. Next is the canard incidence, it is -1.25 degrees not zero. Next is the gross weight, it could be 1300 pounds with the additional spar lay-up."

Oh, yes, nearly forgot. I mentioned above that the Dragonfly doesn't have the Roncz airfoil. That seems to be true. No Dragonfly has yet been made with the Roncz airfoil. But I know that somebody is working on one! I wonder what airfoil they are using now.

I got this remark from Ted Forringer: "The dragonfly still uses the GU airfoil for the canard. While some would say it is a bad airfoil, dragonfly fliers would say, "it works." There are two major complaints, bugs and raindrops, both of which can seriously degrade the performance of the canard. Light sanding 200 grit takes care of the rain problem or vortex generators take care of both problems. Many would say there is no reason to change. I say, if a better airfoil exists, why not try it. [ed.: Ted is actually doing what his heart is saying: building the dragonfly with a Roncz airfoil]"

When you read this one would think that the Dragonflies have a problem. Wrong thinking. Clever people always find a solution and it was found for the Dragonfly. Just read the next remark.

I got this remark from Owen Strawn: "The Dragonfly still uses the GU25 (modified) airfoil for the canard. One person built an LS-1 canard like the Q's use, but he retired and cut up his airplane. And of course as you know the Raptor group is working on Roncz canards. But as far as I know all Dragonflies currently in existence have GU25 (modified) canards.

For those Dragonflies that suffer noticeable loss of lift when the canard is wet or bugged up (some don't have the problem), vortex generators added to the top of the canard seem to resolve the problem nicely."