

Baptism *at* Bewl

ARMED WITH HIS SPRUCE GOOSE AND A PONDFUL OF WATER, TONY NIJHUIS RECREATES A MOMENT OF AVIATION HISTORY

Having experienced the elegance of the model on water the retractable undercarriage seemed, somehow, distasteful and I really couldn't bring myself to fly her off land again. With suitable flying boat venues in short supply, coupled with the issues of storing such a large airframe, I decided to sell her shortly after.

The tip floats have a flexible mounting on the underside of the wing and are braced with rigging wires that prevent sideways movement.

Sitting in the water with her undercarriage doors taped up and the operating system disconnected! She really does look the part. What a pity the full-size wasn't given more of a chance.

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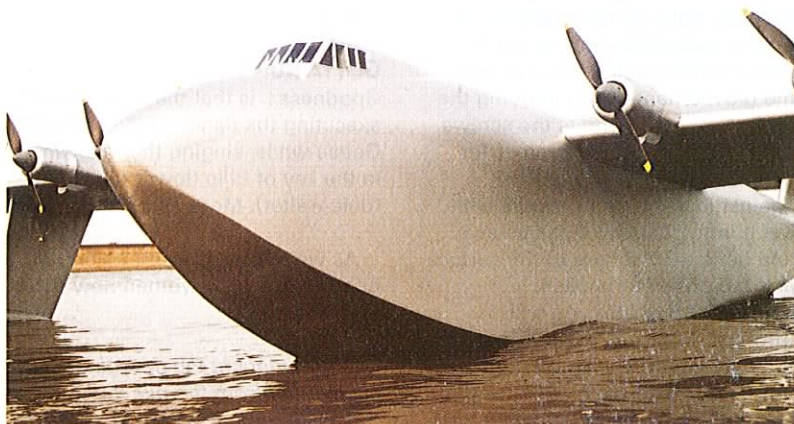
I say this after a most memorable few hours spent at the Bewl Water reservoir in deepest Kent, flying my Spruce Goose off water for the very first time. A beautiful, tranquil setting, perfect weather with near calm conditions and a cloudless blue sky... a real oil painting of perfection.

SPRUCELESS GOOSE

The full-size Spruce Goose (also known as the HK1) began as a joint venture between Howard Hughes and industrialist Henry Kaiser. It was conceived in 1942 as a personnel and material carrier, designed to fly transatlantic to avoid German submarines that were sinking Allied ships in large numbers during W.W.II.

The nickname 'Spruce Goose' came about due to the fact that it was built predominately of wood, although there was no spruce actually used in the construction. Howard Hughes eventually took over the project and being a perfectionist the newly named H-4 cost much more, and took far longer to build, than had ever been envisaged. Worse than that, however, was the fact that the war ended before it was finished.

On the 2nd of November 1947 Howard Hughes flew the Spruce

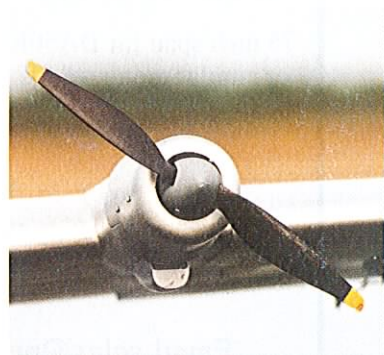


Goose from Terminal Island, Long Beach, California for just over a mile - its first and only flight. He then placed the Goose in a custom built hangar and ordered her to be maintained in flight-ready condition, where she remained until his death in 1976... at a cost of approximately one million dollars per year! Today the Spruce Goose is housed at the Evergreen Museum in Oregon and with a wingspan of 320' it's still the largest span aircraft ever built.

WALKING ON WATER

Gently lowering the model into the water I could imagine how Hughes must have felt, watching his giant creation slowly descend the slipway. There's something about seeing a flying boat in its natural habitat, on water... its character changes, becoming serene and elegant.

We were fortunate to have a floating jetty at our disposal that extended some 50' out over the water's edge, giving us a lovely clear, panoramic view of the reservoir. So, with the scene set and the ed. with his camera at the ready, the 'Goose was gently coaxed out from the shoreline using the lowest possible throttle setting. There was no hurry, the taxi out into clear water was a moment to really savour. Control on water can be difficult, but operating the left and right bank of





Taxi trials proved, beyond doubt, that differential motor control is a superb way to steer an aeroplane on water. She really did handle beautifully.

They say that eight engines are more efficient than four and having flown the Goose I have no reason to doubt it whatsoever.

motors independently allowed the model to steer perfectly with differential power.

Having spent a number of years playing with R/C boats I was thoroughly enjoying myself and would have been quite happy to continue driving the Goose around the reservoir until the batteries ran down. However the assembled audience wanted more, so the throttle was progressively opened and a little up elevator applied to haul the model up onto the 'step'. In no time it was planing at speed across the calm water, at which point the elevator was neutralised. There's something emotive about watching a flying boat racing through the water... it's a special moment, one you want to capture again and again. With only the slightest touch of up of elevator the aircraft rose majestically into the air, water trailing from the hull.

Having 'unstuck' the aircraft was in familiar territory. Whereas I'd normally climb for height, the sheer expanse of calm water all around

gave a strange reassurance and acted like a magnet that encouraged low-level flight. As I entered the first turn the prospect of a touch and go was already firmly in mind.

WORKSHOP TO BOAT YARD

What was it that prompted me to build a model of the Spruce Goose, and in particular an electric one? Well, it's said that imitation is the sincerest form of flattery, and after seeing an 80" span speed 400 version (designed and piloted by Robin Andrews) at the Bickley electric fly-in some years ago, I was inspired. I remember saying at the time that one day I'd build one for Speed 600 power.

The intention may well have remained a pipe dream had it not been for fellow Hastings club member (and all round good egg) Gill Ranson who, about a year later, announced he was building the Robin Andrews Spruce Goose. Needless to say the plan very soon found its way into my grubby mitts and the rest is history.

Robin's design is very simple and could, therefore, be made very light

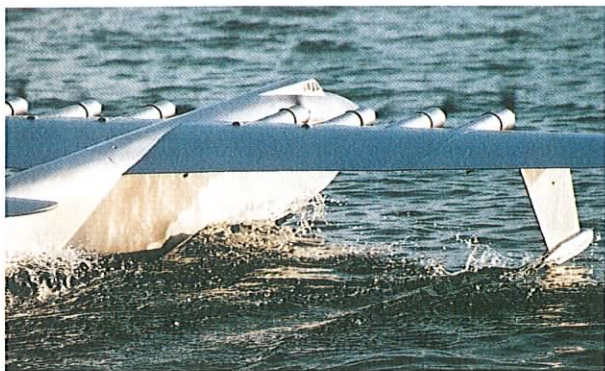


with the appropriate wood selection. Based on my successful 24 lb, 11' Lancaster, which is powered by 4 x Speed 600 motors and 40 cells, I decided the span of the Spruce Goose could be pushed from 80" to 180", weighing in the region of 30 lb.

The wing section on the original plan was a simple flat-bottom Clark 'Y' which, although appropriate for the 80" version, wasn't going to be suitable at 15'. Thus, the wing plan was redrawn and a new set of ribs designed (on Compufoil) using an Eppler 205 section, modified for a

I'd have been happy steering the model around on the water all evening, but the crowd wanted more!





Onto the step and away. Take-off was slow, majestic and totally real with a beautifully gentle climb-out - very pretty to watch.

An apprehensive Tony stands with the 15' span model just prior to its maiden voyage.

30% increase in depth. This increase also allowed enough depth for the four 10-cell battery packs to fit cleanly into the wing forward of the main spar. For ease of transportation the wings were made in three sections; a 100" centre-section, to include all eight motors, and two 40" outer panels. Full-length ailerons on the outer panels were used due to the anticipated slow flying speed... in essence the Goose was going to be a powered glider. This also meant a large operational rudder was essential as a slow, stable model of this size wasn't going to turn on ailerons alone.

Attached to the underside of the outer wing panels are the pontoon floats. I decided early on to avoid fixing the floats to the wing rigidly,

electing instead to use three lengths of spring curtain wire as flexible fixing dowels. Rigging tension wires were used to restrain sideways movement and to hold the floats in place. The tension wires were designed to break if a sideways knock occurred, thus avoiding any structural damage.

In practice this has worked very well and has saved wing and float damage on numerous occasions.

The nacelles were constructed from sheets of balsa rolled over and around a former, each assembly then inserted through the leading edge and into the wing. A plug mould was made to produce eight identical fibreglass cowl mouldings, these being just large enough to encase the Permax 600 motor and 3:1 gearbox.

Acquiring eight motors with corresponding gearboxes proved a bit of a headache and after a fruitless wait I eventually contacted West London Models who had everything I needed in stock. Needless to say, my order arrived the next day... what service! Apparently West London Models deal directly with Multiplex, which means that spare parts such as gearbox bearings, drive shafts etc. are readily available... very useful.

For ease of transport the fuselage was constructed in one piece and then cut into two sections with the joint just behind the wings. The front section, incidentally, contains all the avionics, radio batteries and the retractable undercarriage mechanism. At the back, the huge tailplane uses an identical aerofoil section to that of the wing and, once again, was made in two halves for storage purposes. These are slid onto a 10mm carbon rod before being

plugged into the fin and secured for lateral movement.

Although the model is large the aerodynamic loads were going to be relatively small... no loops or rolls for this model! As a consequence there was no real need to go with powerful, high-speed servos so I elected to use the Jtec 6kg/cm SO6 unit on all primary surfaces. Although these are economy servos they've proved to be very reliable. For ease of operation on water two receivers are used, each being connected to duplicate battery packs to give essential backup in case of single pack failure.

The full-size Spruce Goose was designed strictly as a flying boat so there was no undercarriage. However, the model was initially built for use on land and therefore an appropriate retractable undercarriage had to be designed. Having played with a number of options (including a single glider-type centre wheel) my final solution was a tricycle undercarriage with a steerable nose wheel, with all wheels retracting through the bottom of the fuselage (main legs retracting forwards, nose leg retracting backwards). Close-fitting doors were used to keep the visual effect of a seamless hull, spring-loaded to close once the wheels had retracted. Although invisible in flight, the doors were by no means watertight!

OUT FOR A GANDER

In order to prove my electric designs I usually test fly them before the covering stage. So, after six weeks of building the bare model was rolled out for its first flight in early March 2003. The day was horrible,





with rain in the air and a nasty crosswind that was gusting to 15 knots. Unperturbed, I unleashed the model and she rose majestically into the air, climbing away like homesick angel. I remember being quite taken aback, hardly believing the model

Thinking that plain silver wasn't very inspiring I carried out a bit of research into possible colour schemes had the aeroplane ever gone into service as a wartime naval transporter. Blue and sea grey seemed to be a favourite among the



Once airborne the Spruce Goose is very gentle to fly, much like a powered glider.



was flying with such gusto and authority. Almost no trim adjustment was needed and the control was easy and precise. After landing I remember commenting that 'you don't have to fly this model, you just guide it'. Thus reassured, the Goose was taken home for the next stage - covering and painting.

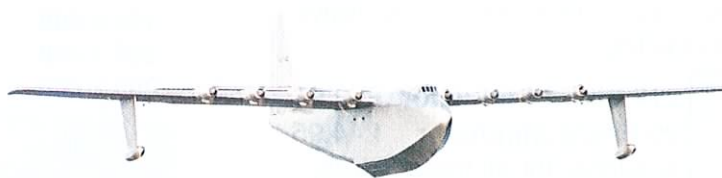
GILDING THE GOOSE

At the covering stage the anticipation of one day flying the model off water saw the hull bottom being covered with glass cloth and epoxy. The remainder of the airframe was covered in silver Easycoat iron-on film, which was then etch-primed and painted in a blue / grey colour scheme. More informed readers might have noticed the original (and only) colour scheme for the full-size Spruce Goose was in fact silver.

Having a lot in common with a powered glider, the Goose's final power ratio of 40 watts / lb has proved to be more than adequate. In fact on a warm evening last summer, thermal activity caused one complete circuit to be achieved without the aid of power and without any appreciable loss in height. Another huge benefit when it comes to efficiency is the number of motors and props. It's a well-known concept that two motors are better than one and that four is better than two... having eight motors really does seem to make an incredible difference.

The model was completed in May 2003 and clocked up some 30 flights over the following year; in March 2004 it was recovered in lightweight glass cloth and repainted in silver in readiness for its baptism at Bewl.

If there was ever an element of radio control aeromodelling that has to be tried before lifestyle or age causes you to hang up the transmitter, it must be to fly a model off water.



Set her up for landing and she practically flies herself onto the wet stuff.



flying boats of the time, so it seemed fittingly appropriate.

The completed model weighed a very creditable 34 lb, including 6 lb of batteries! With a wing area of 25 sq. ft. the wing loading is an incredibly light 23 oz / sq. ft.

Special thanks go to Southern Water, and in particular Howard McKenzie, for allowing us to fly at the reservoir and for the hospitality extended.