Shindig

50in Span Electric Sports Model 4/500w Motors & 4-6 Channel RC Equipment.

Designed by: Stan Yeo

Produced by: Phoenix Model Products

Introduction

The Shindig is was inspired out of reminiscence of models we built too many years ago, particularly the Mini Super / Tyro. It has been designed to take advantage of modern manufacturing techniques, the improvements in the performance of electric flight packs and current radio equipment, yet retain the character of these vintage models.
Construction of the Shindig is a combination of old and new. Wood parts are either produced on a laser cutter or are routed out. The 'D' box wing uses our now standard full depth mainspar system, half span ailerons and ribs with cap strips. The fuselage sports balsa sheet sides with a ply doubler to reinforce the nose section. In keeping with tradition the Shindig features a built-up Tailplane. The Shindig is relaxing to fly and will loop, roll and spin in the manor expected of this type of sports model.

Radio Equipment Required

The recommended radio equipment required for the Shindig is two metal geared micro servos i.e. Hitec HS82MG or the Ripmax New Power XL16HM or XL17HMB for the Ailerons plus two standard size servos for the Rudder & Elevator with a 4/6 channel receiver.

Electrical Power Train

The Shindig requires a 3536 Brushless Motor rated at 400-500w and 1000 – 1300 Kv. A 50/60A Speed Controller (ESC) and a 2200 / 2700mAhr 3S LiPo. The prototype used a 3536/06 1250Kv motor with a 60A ESC. 9x6in APCE propeller and a 2200mAhr 3S 30C LiPo. With this set-up the Shindig is more than adequately powered with typically flight duration of 10 minutes. If you use a different specification motor or a 4S battery then a different size propeller should be used. If you are unfamiliar with model electrics then please read the articles on our website www.phoenixmp.com .

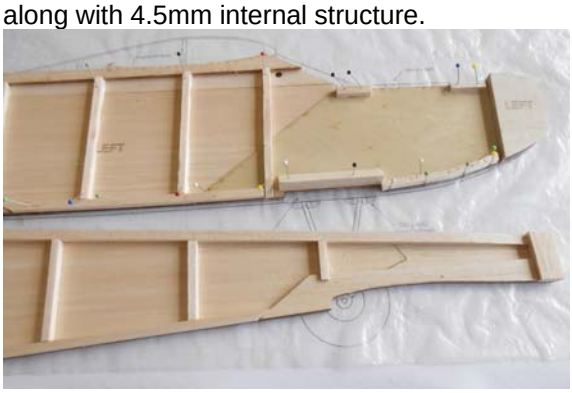
Tools / Materials Required

The tools required to build the Shindig are a modelling knife with spare blades, a 2ft /1 Metre Straight Edge, a miniature David Plane,180 grade Wet & Dry sanding block and soldering iron. The glues used to build the model are white PVA wood glue, thin Superglue (please observe safety precautions) and a very small quantity of two part epoxy. We recommend using a polyester heat shrink film for covering such as Oracover/Profilm, Monokote or the thinner more economic version Easycoat.

Please Note: PVA is the recommended glue for nearly ALL wood joints, particularly when building the wing. Also for maximum glue joint strength we recommend lightly sanding laser cut edges before gluing.

Building the Fuselage

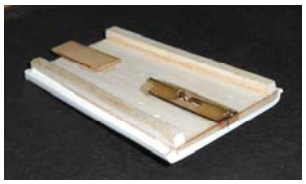
1. Glue fuselage extensions to sides to complete fuselage sides.
2. Using a ***spirit*** based contact adhesive such as Uhu or EvoStik glue the ply nose doublers in position ensuring there is a left and right side. Motor side thrust and down thrust is built-in consequently the F1 former is further back on the starboard side than the port (left).
3. Mark out the position of formers F2 & F3 on the inside of the fuselage sides.
4. Glue wing and tailseat doublers in position along with 4.5mm internal structure.



5. Sand edges of fuselage sides with 180 grade Wet & Dry to provide a good gluing surface for top and bottom sheeting.
6. Dry assemble fuselage sides and formers F2 & F3 over plan view of fuselage.
7. After ensuring the fuselage is properly aligned and all square glue formers F2 & F3 in position. Use rubber bands and weights to aid alignment whilst the glue is setting.
8. Remove fuselage from plan and using 2mm sheet cross-grain sheet fuselage bottom between F2 & F3. When glue is set trim to size. Replace fuselage over plan as before.
9. Join fuselage at the tail using centreline on plan to aid alignment.
10. Fit motor former F1.
11. Glue left and right nose cheeks together (they are labelled). Thin Superglue can be used for this operation. If you have any thin superglue that is slow to go off this is ideal as it can be spread on one surface and left to set under

weights. If using fresh Superglue we suggest assembling the cheeks and gluing around the edge. Capillary action will take the superglue deep into the surfaces being joined. Leave under weights for a period of time for the superglue to set! Use cling film to stop excess glue gluing work to work surface or weight.

12. Fit nose cheeks to fuselage not forgetting to angle the former joint to fit former.
13. Fit ply undercarriage plate and spruce wing backstop.
14. Shape 14swg Piano wire tailskid and assemble using epoxy. Glue in position.
15. Fit remaining 2mm sheet top and bottom.
16. Fit 6mm sheet front and back of hatch position. Note front sheet will require adjusting to accommodate former sidethrust.



17. Fit 0.8mm ply end plates.
18. Fit 6mm sheet cockpit front.
19. Cut hatch to length allowing for the fitment of ply end plates and fit 0.8mm endplates.
20. Fit 0.8mm ply Hatch locator tab and latch protector plate to underside of fuselage at rear of hatch.
21. ***Build Fin and Tailplane.***
22. Place fuselage on flat surface with weights on wingseat to stop it moving.
23. Fit Fin ensuring it is both vertical and aligned centrally on the fuselage.
24. Cut slot for Rudder control rod in position indicated on plan.
25. Fit Wing and Tailplane 5mm hardwood dowels. What satisfied remove and harden holes with thin superglue. DO NOT glue dowels in place and do NOT replace dowels in the holes for at least 24hrs. Whilst it might appear the glue goes off after a few seconds it takes several hours before it has ALL gone off!
26. Mount Rudder and Elevator servos. Refit rudder / elevator control horns.
27. Mount Tailplane on fuselage and tape Elevator in neutral.
28. Assemble control pushrods. Start with threaded control rod. Fit Z bend to servo and cut balsa pushrod to length. Bind threaded rod and Z bend with multi-strand cotton. Seal with PVA wood glue.

Building the Fin & Tailplane

1. Cover Tailplane & Fin section of plan with thin polythene and pin glue Tailplane superstructure in position.
2. Glue 4.5mm x 6mm cap strips to top of 'rib' superstructure.
3. Fit 4.5mm centre sheeting.
4. When glue set remove Tailplane and cap / sheet the other side of the ribs.
5. Fit Tailplane trailing edge and Elevator Torque rod.
6. Sand ribs to shape.
7. Shape and fit Elevators. Hinge using Mylar strip cut as shown on the plan.
8. Build Fin superstructure and sand to shape. Glue triangular strips to base of Fin and sand base flat so that Fin stands vertically on a flat surface.
9. Shape Rudder and hinge using Mylar strip as before.
10. Fit control horns. After fitting remove horns reinforce screw holes with thin superglue.

Building the Wings

1. To protect the plan cover in either thin polythene or cling film.
2. Accurately align bottom leading edge sheet on plan and pin. Note front of sheet overhangs front of rib and rear of sheet aligns with rear face of mainspar
3. Pin 1.5mm trailing sheet in place.
4. Glue in position bottom rear sheeting.
5. Accurately mark position of mainspar on bottom sheet and using a straight edge glue and pin mainspar in place.
6. Using wing ribs to position 3mm sub-spar pin sub-spar in place using packing it up 1.5mm to account for thickness of rib capping strips.
7. Using scrap 1.5mm sheet pack up front of bottom LE sheeting to conform to rib profile.
8. Glue ribs in position.
9. Assemble and glue wing servo mounts in position. Do NOT pre-glue servo mount assembly. Assemble and mount in wing with glue still runny to allow alignment.

10. Fit 1.5mm Ply dihedral brace as shown on plan along with 3mm x 6mm spruce strip to sub spar.
11. Fit 0.8mm ply servo lead protector in rear bottom sheeting.
12. Glue 6mm square hinge reinforcement to rear spar as shown on plan and 1.5mm spruce brace across aileron start position.
13. Attach top leading edge sheeting. Use rubber bands etc. to hold the sheeting in place whilst the glue sets.
14. Build second wing but do not attach top sheeting until wings are joined
15. Dry join the wings. Setting dihedral at 10mm under each tip to avoid the anhedral look!

16. When satisfied glue wings together and attach top leading edge sheet to other wing.
17. Fit 3mm x 6mm spruce centre brace to rear spar.
18. Using David plane and sanding block sand leading edge sheet back to rib ends.
19. Place Sellotape along sheeting edges to collect surplus glue. Tip: Do not try to align Sellotape with edge of sheet but let it overlap and trim with a sharp scalpel.
20. Glue leading edges in position using masking tape to hold in place whilst glue sets.
21. Position servo extension leads in wing ensuring plug to connect to the aileron servo is outboard of centre section sheeting.
22. Fit top centre section sheeting. Fit rib capping strips. Fit 0.8mm ply end rib.
23. Fit 4.5mm wing tips aligning rib chord line. Glue tip superstructure in place.
24. Sand leading edge to shape.
25. Harden leading edge with thin superglue in wing band area.
26. Glue 0.8mm ply wing band protectors in place.
27. Construct Ailerons. Bevel leading edge as per plan.
28. Add 0.8mm ply ends to Ailerons and Aileron joint to wing. Allow a 3mm gap between Aileron end and wing to allow for thickness of covering material.
29. Hinge Ailerons using Mylar strip.
30. Centre Aileron servos.
31. Install Aileron servos checking they are operational via the fitted servo extension leads.
32. Determine position for slot for Aileron control horn. Cut slot for Aileron control horn. Must be a snug fit. Glue in place after covering.
33. When complete add 0.8mm ply end plates using Superglue to both ailerons and wing.
34. Give wing finaling sand using 320 grade Wet & Dry and remove dust with brush and vacuum.

Covering & Finishing

1. The originals were covered in heat shrink film (Profilm/Oracover). This has proved more than adequate. Should you wish to cover in a different material please take into account any potential weight penalty that it may incur and puncture / tear resistance / repairability.
2. Give the complete model a final sanding with 320 grade Wet & dry. DO NOT use a sanding block on wing sheeting. It thins the sheeting on top of the rib and seriously weakens the wing.
3. Before covering vacuum clean the model to remove embedded dust to avoid 'pimpling' when covering. Also position aileron servo arms so they do not protrude above wing surface.
4. Please follow the instructions for the covering material being used. Normal procedure is to tack the material at one end. Tack the other end and then proceed to gently stretch and tack along its length before sealing all along the edges and shrinking with a Heat Gun.
5. Superglue Aileron control horns in position and hinge Ailerons using Mylar strip supplied.
6. Centre Aileron servos using transmitter sub-trim and adjust Aileron pushrods. When satisfied tape servo covers in place.
7. Fit undercarriage and motor etc.
8. Fit controls, hinge rudder, carry out final adjustment to elevator neutral and balance the model including the wings (laterally).
9. Set the control movements as per the plan i.e. Elevator +/- 10mm. Rudder +/- 30mm. Aileron Up 16mm Down 13mm. Exponential is recommended for both Aileron and Elevator controls. Typically 30%. If using 2.4Ghz R/C equipment (recommended) it is it is imperative you re-bind / pair the receiver to update failsafe settings after set-up and before flying your Shindig. Note the throttle stick MUST be in the low position when carrying out this operation. Also check that when the there is a loss of Tx signal the motor shuts down. Failure to do this has resulted in a number of serious accidents. Remember the Transmitter is first ON and last OFF! After landing always disconnect the battery on reaching the model.
10. A few simple rules for electrics. In flight it is normal for the battery, motor and speed controller (ESC) to get warm but if they gets hot then the reasons could be insufficient cooling, too large a propeller or the battery / ESC of too low component specification specification. For the battery it could be due poor condition, too low a 'C' rating allied to lack of capacity. To avoid discharging the battery below the recommended voltage always land when you notice there is less power on full throttle. When landing in foliage cut the throttle immediately to avoid burning out the speed controller / motor. Before and after each flight is advisable to check battery capacity (charge state). Remember if any of the cells fall below 3v this can result in permanent damage to that cell / battery pack.

Flying

When satisfied the model is set-up and ready to go choose a suitable site and day to test fly i.e. wind not too strong or turbulent. If you are inexperienced please seek assistance for the maiden flight. The wing bands should the tight enough to stop the wing moving in flight yet allow the wing to move if model lands awkwardly. If set up correctly very little trimming should be required although some down elevator compensation may required at full throttle to control the rate of climb. The Shindig, as previously mentioned, is a lively model and capable of any manoeuvre expected of a high wing trainer including inverted flight and multiple rolls. Finally we hope you have enjoyed building the Shindig and it gives you many hours of pleasurable flying.

Happy landings,

Stan

12-Jun-15