

Cheerie

38in Span (965mm) Electric Sports Model 250/350w Motors & 4 Channel RC Equipment.

Designed by: Stan Yeo

Produced by: Phoenix Model Products

Introduction



The Cheerie is a perky little 4 channel electric power sports aerobatic model. Something to quickly put in the car for one of those impromptu evening flying sessions. Prior to this of course Cheerie has to be built. This in itself is a pleasure if you like a bit of balsa bashing. The full size plan, a set of comprehensive instructions and accurately CNC cut parts that take the drudgery out of building off plan. Construction is simple and easy to follow. Very similar to its big brother the Wallaby Mk2.

Radio Equipment Required

The recommended radio equipment required for the Cheerie is three metal geared micro servos i.e. Hitec HS82MG or the HD-1711MG /Ripmax New Power XL16HM or XL17HMB for all control surfaces with a 4 channel Transmitter / Receiver.

Electrical Power Train

The Cheerie requires a 2836 size Brushless Motor rated at 270- 350w and 1000 – 1300 Kv. A 40A Speed Controller (ESC) and a 1600 3S LiPo. The prototype used an Overlander 2836/06 1270Kv motor with a 40A ESC. 8x6in APCE propeller and a 1600mAh 3S 35C LiPo. With this set-up Cheerie is more than adequately powered with a typical flight duration of 6 -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 .

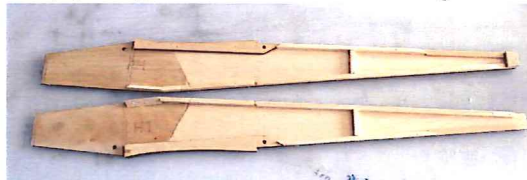
Tools / Materials Required

The tools required to build Cheerie 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 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

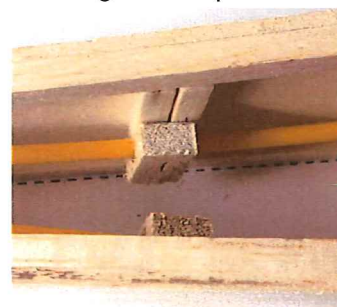
1. Lightly sand the ply fuselage doublers with 180 grade wet and dry to remove the 'release' agent. Remove dust with a small brush or vacuum cleaner.
2. Using a *spirit* based contact adhesive such as Uhu or EvoStik glue the ply nose doublers in position ensuring there is a left and right side. Motor side thrust and down thrust is built in consequently the right side is shorter than the left!!!
3. Mark out the position of formers F2 & F3 on the inside of the fuselage sides ensuring there is a left and right side.
4. Cut slot for Rudder and Elevator cable exits as indicated on plan (Both underneath Tailplane).
5. Glue strip longeron super structure including triangular support strips in the nose, Wingseat and ply wing dowel washers to fuselage sides.



6. Lightly sand edges of fuselage side to prepare gluing surface to receive top and bottom sheet.

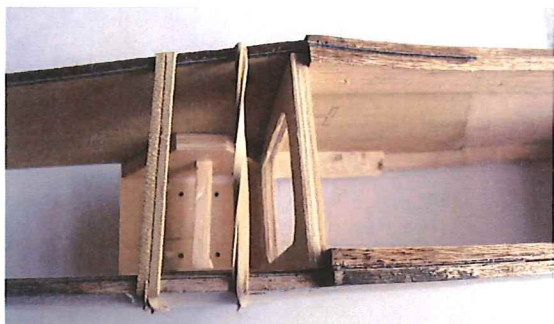
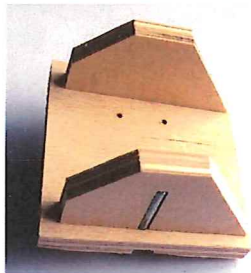


7. Join fuselage sides together over the plan ensuring that both are straight and square.
8. Before removing fuselage from plan fit spruce trailing edge back-stop, top 4.5mm sheet at front and rear of hatch and rear top sheeting.
9. Fit Rudder and Elevator control rods. Control rods exit fuselage on opposite sides. Anchor to fuselage sides every 100-120mm using scrap balsa. Superglue in place.



Before fixing control cables check control cables are not binding and move freely. Tie and glue control rods together where they cross.

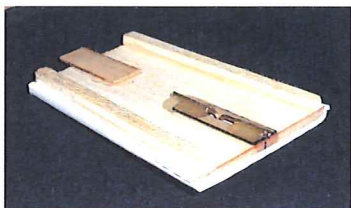
10. Glue undercarriage in place. Use 12g nails to align U/C base with 6mm ply



side plates. See photographs.

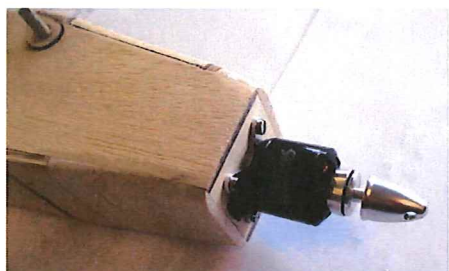
11. Fit Fuselage bottom front and back including ply undercarriage plate using PVA glue.
12. Construct Hatch and fit as per diagram.
13. Lightly mark out centreline on tailplane ensuring it is square to the hinge line.
14. Glue triangular strips to base of Fin and glue Fin to Tailplane ensuring it is perpendicular and **square**. If, when glue has set, Fin is not quite perpendicular to the Tailplane then slice the triangular strip on the acute angle (leaning towards) side and insert a thin cardboard wedge to correct any inaccuracy. Superglue wedge in place.
15. Glue Tailplane in place checking that it is both horizontal and the distances between hinge corners on tailplane to centre of F2 are equal.

16. Cut Mylar Hinges to size (12mm x 25mm). Trim corners to stop them digging in and roughen gluing surface with Wet & Dry



17. Laminate tailskid with 1.5mm ply and 1.5mm balsa scrap. Dry fit Rudder. Glue Tailskid in place using Rudder for alignment.

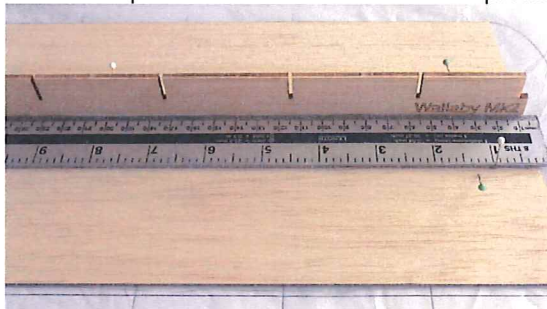
18. Fit Rudder and Elevator servos. Note distance (30mm) from front of F3 to avoid fouling Aileron torque rods.



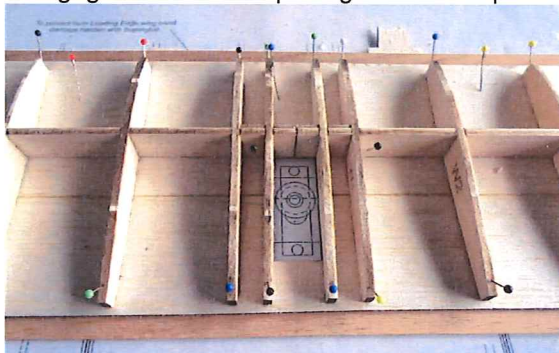
19. Hinge Rudder and Elevator control surfaces. Do NOT glue until the model is covered.

Building the Wings

1. To protect the plan cover in either thin transparent polythene or cling film.
2. Join front & back 1.5mm bottom sheeting. Use metal straight edge to trim for a good joint. The sheeting has been Laser cut but may require further trimming due moisture changes in the wood. Sellotape them together along the joint. Hinge joint back and insert PVA glue. Place on flat surface and wipe away excess glue. Run Sellotape along top of joint. Weight down until glue set. Repeat for top sheeting.
3. Accurately align bottom sheet on plan and pin to plan. Note sheeting overhangs rib ends by approximately 2mm.
4. Elevate underside of sheeting at front and rear with scrap to conform to airfoil profile.



5. Join mainspar at centre using ply wing brace.
6. Accurately mark position of mainspar on bottom sheet and using a straight edge glue and pin mainspar in place.
7. Using guide lines on plan glue ribs in place.



8. 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.

9. Fit 1.5mm top sheeting taking care to ensure that it is making contact with both the wing ribs and the mainspar. Tip: Use masking



- tape to help support sheeting whilst glue sets.
10. When glue is set remove Sellotape.
11. Carefully plane/sand both rear spar and leading edge to shape. Tip: when using David Plane set blade at slight angle so that the cut is

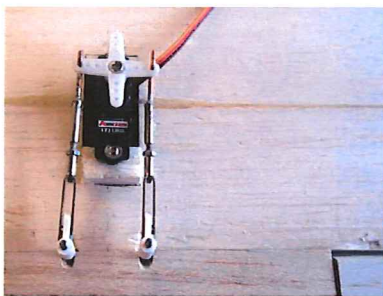
thinner on one side of the plane. It helps control thickness of cut.

12. Glue Leading edge & Rear spar strip in place. Use masking tape to hold until glue sets.
13. Glue 0.8mm ply end ribs to balsa tips. Again there is a Left & Right! Roughly shape and glue tip in place taking care to align tip end rib with wing end rib.
14. Sand wing tips to shape.
15. Cut slots in centre section trailing edge for Aileron Torque rods. Glue TE in place taking care not let any glue interfere with the free movement of torque rods. Check when glue set.
16. Shape Ailerons and cut to length.
17. Tape ailerons in position using Wing Tip as a reference. Check for twist.
18. Using ailerons as a guide mark TE position on centre section trailing edge. Lightly draw guide line along TE.
19. Shape centre section trailing edge using Aileron as a reference.
20. Shape ailerons and cut to length.
21. Give wing a final sand using 320 grade Wet & Dry.



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.
4. Please follow the instruction 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. Spray motor cowl to match your colour scheme (rattle can) (Hycote gloss white is a perfect match for white Profilm).
6. Fit aileron servo output arms in centre position.
7. Hinge Ailerons using Mylar strip supplied.
8. Centre Aileron servo using transmitter sub-trim and adjust Aileron pushrods.
9. Fit controls, hinge rudder, carry out final adjustment to elevator neutral and balance the model including the wings (laterally).
10. Set the control movements as per the plan i.e. Elevator +/- 10mm. Rudder +/- 30mm. Aileron Up 13mm Down 10mm. Balance point 52mm +/- 3mm from Leading Edge. Exponential is recommended for both Aileron and Elevator controls. Typically 30%.
11. If using 2.4Ghz R/C equipment it is recommended that you re-bind / pair the receiver with throttle stick in low throttle position to update failsafe settings after set-up and before flying your Cheerie. Failure to do this has resulted in a number of serious injury accidents. Remember the Transmitter is first ON and last OFF!
12. A few simple rules for electrics. In flight it is normal for the battery / speed controller (ESC) to get warm but if it gets hot then the reasons could be insufficient cooling, too large a propeller or the battery / ESC of too low a 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 loss of power on full throttle. When landing in foliage cut the throttle immediately to avoid burning out the speed controller.

Flying

When satisfied the model is set-up and ready to go choose a suitable site and day to test fly it i.e. wind not too strong or turbulent. The wing bands should be 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. The Cheerie, as previously mentioned, is a very lively model if set up with extravagant control throws and is capable of a wide variety manoeuvres that could be expected of this type of model including sustained inverted flight, inside and out side loops plus blink and miss rolls. The only real limitation is your flying ability and imagination!

Happy landings,

Stan