Building a Kyosho Seawind

Beyond the Instruction Sheet

Improving or Rebuilding the Kit Boat

Moulding Release Coating

Moulds are sprayed with a release agent to prevent the plastic from sticking. This needs to be cleaned off before gluing, fibreglassing or painting. It can be cleaned using warm soapy water or detergent. Resin, especially polyester, can have a small amount wax included to form a thin air-proof coating to aid setting. This needs to be cleaned off if another layer or glue needs to be added. Carbon tetrachloride is best for doing this though it can be difficult to obtain and is dangerous to use. For best adhesion surfaces should be lightly sanded to roughen the surface.

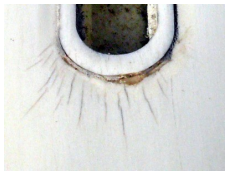
Warnings and Materials

Some resins, fillers and glues can heat up while setting. This is especially when too much catalyst is used. Heat can distort or damage the ABS plastic that this boat is made from.

'Superglue' has good bonding properties and can set quickly. Over a long time, though, it can become brittle and may break.

The ABS Hull

The hull is moulded in several steps and this leaves 'flash' or mould marks when these join. The deck edge has a slight overhang and this should be trimmed using a sharp blade held against the topsides. The deck edge should not be rounded off too much as this could reduce the strength of the join. There is a mould line on the forward starboard topsides. This should be filled and sanded for minimum drag when sailing and best appearance.



The hull tends to flex at the front end of the keel box as the blade racks back and forward. This is particularly stressful when the boat is stopped by running into buoys, other boats, or the edge of the pond. This flexing results in stress cracks radiating from the leading edge of the box and eventually the box will break away from the hull.

Reinforcing, or repairs, of the keel box can be done using fibreglass and resin but I prefer to stiffen the hull with wooden, or

plywood, strips that are glued each side of the box and reach forward several centimetres glued to the hull. This eliminates flexing and prevents any cracks forming. If this is done to repair a cracked hull the space in front of the box can be filled with epoxy putty to seal this.

Reinforcing strips should not extend behind the keel box as this will interfere with the sail servo which is close behind the keel.

The Carbon Fibre Hull

The CFE hull is much lighter than the ABS one, but this advantage is lost when the boat has to be ballasted up to minimum weight for racing. The lightness results from the skin being very thin. While the ABS hull is stiff and firm to touch, the CFE skin can be pushed in quite easily. This flexing of the skin can lead to the clear gloss coat breaking down and surface fibres breaking.

The CFE keel box also needs strengthening. Not only as for the ABS hull, but also the roof of the box needs to be fibreglassed. There have been cases where excessive force on the keel has broken the box leading to boats almost sinking. One case was caused by the boat dropping onto its keel.

The CFE deck is fibreglass and is bonded to the hull. The holes for the deck fittings are not 'blind', as they are on the ABS hull, and these should be blanked off under the deck if they are not used otherwise they will leak. The shroud and stay plates take a high load and with the screws just through a single layer of glass they could pull out. It would be useful to add an additional layer of glass under the deck around these screws to give a better grip.

The deck/hull joint around the shroud plates also would be usefully reinforced by an additional layer of glass. A fillet of epoxy putty could be pressed into the corner of the join and then a strip of glass laid under the deck and down the inside of the hull for a few centimetres forward and aft of the plates.

There has also been cases where the bow has split open, probably caused by ramming the pond edge too often. It was difficult to see that this had occurred until the boat was held bow down and the water rushed out. It would be advantageous to reinforce the bow inside before it splits. This is very difficult to access. It can be done with specially shaped wooden tools pressing fibreglass, or epoxy putty, into the bow. Alternately it may be possible to pour a liquid glue into the box to form a fillet.

In general I would not recommend a CFE Seawind.

The Keel Mast Structure

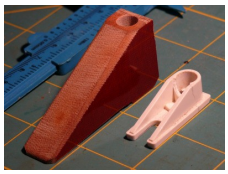
The keel and mast are supported by a structure of tubes and plastic fittings between the keel box and the forward deck. This also supports the front end of the servo tray and the battery box on the port side.

The silver tube fits between the base support and the mast support (C3). This assembly is put in place in the boat and the blue tube then is inserted through the deck, into the silver tube and it screws into the keel box. The keel rod then is inserted into the keel box through the blue tube and the nut holds it in place.

These rods and tubes are of dissimilar metals and corrosion can form locking them all together. Then they are difficult to take apart without cutting or breaking them.

The mast support piece (C3) is not well engineered and mast loads will eventually cause this to fail. I have made larger and stronger replacement parts from more suitable materials, such as Tufnol. It may be possible to reinforce the standard parts by filling it with epoxy putty or by adding an additional brace.

The base of the silver tube sits in a socket in the base support. The bottom of this socket can break away under load. I have tried reinforcing this with a cable tie set in epoxy to bind the base. So far this has worked.

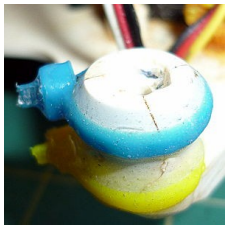


The Servo Tray

The servos are attached with screws into the posts. The threads put outward pressure on the posts which is increased if the screws rust as this expands. The posts take sideways loads from the servos and they eventually fracture which leaves the servos loose.

Solutions tried include adding tight fitting aluminium tubing or heat shrink tubing to the posts to hold them together. I cut the ABS posts off and replace them with blocks of less fragile material: wood, tufnol, or a tougher plastic. The screws can also be replaced by drilling right through the posts, or blocks, and using nylon bolts which won't expand.

The starboard post socket is also liable to fracture from flexing due to servo forces. This can be repaired with epoxy and by reinforcing with cable ties set in epoxy.



It may be useful to put epoxied cable ties on this when building a new boat to attempt to prevent fracturing.

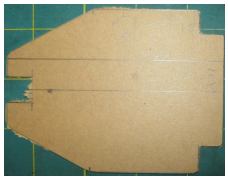
The Rear Frame

The rear frame takes the blue aluminium rudder tube. This tube is threaded and screws into the frame. A small O-ring is included to make it water proof. The threading causes outward pressure on the plastic and this can cause splitting of the plastic and reduction of grip on the tube.

As the rudder shaft is stainless steel there will be corrosion forming between this and the tube. Eventually the rudder can seize in the tube. When this happens it may not be noticed as the tube can be turned by the servo with the O-ring allowing some motion. Eventually, the thread cut into the plastic by the tube will wear allowing the tube to be held only loosely and leaking.

The frame itself takes the rudder servo loads, which are much higher when the shaft seizes as above. The constant flexing can cause the frame to crack. I have repaired rear frames with epoxy and cable ties, and replaced them with tougher plastic frames. The replacement had a small 'nib' which was sprung into place in the hole in the hull with sealing compound. It was drilled to take the rudder shaft directly to eliminate corrosion problems.

The Main Hatch1



The sponge rubber strips supplied with the kit are porous and best replaced with weather proofing seals.

The hatch is too flexible and can bend away from the seals along the sides. This can be stiffened by gluing a plate on the underside. I use 3mm acrylic sheet* cut to fit but any stiff sheet material can be used.

The hatch can be completely replaced. For example with clear acrylic cut to fit closely to the well. It can be secured by toggles on the deck or by a bar that grips under the deck tightened by wingnuts. Self adhesive rubber strips will make it water tight.

*The club has supplies of suitable acrylic sheet available to members.

The Rear Hatch

The hatch is moulded in two parts that form the groove for the O-ring. The area of the gluing surfaces is rather small. I use epoxy glue to join the two parts and then form a fillet of epoxy around the inside. The groove must be cleaned out, removing all surplus glue to ensure a good fit for the O-ring, otherwise it may leak.

The hatch should be secured to the boat. I drill a tiny hole in the hatch and put a string through this tied off with a figure 8 knot above the hatch. The other end is tied around the rear frame. If the hatch dislodges during sailing then at least it won't be lost.

The Keel

The keel blade has two small rectangular holes that are used to locate the keel rod during moulding. Two small pieces are supplied to be glued into these holes, they will need to be sanded flush.

Originally, the keel bulb was lead with a plastic cover that was required in some countries for environmental reasons. In later kits the lead bulbs were coated in epoxy which removed the need for the cover. The Readyset replaced this with a steel bulb that has roughly the same weight and is thus larger and more bulky.

The lead bulb may require some filing and fettling to give a perfect fit to the keel blade. After fitting the bulb the hole for the nut can be filled to avoid drag. I would suggest plasticine as this can be dug out relatively easily if required.

The top of the keel blade should be carefully fitted flush into the socket to give minimum sailing drag and to restrict movement. This may require the notch where the rod is to be filed and cleaned to allow the keel to seat fully.

The keel should be installed in the boat with plenty of waterproof grease, or perhaps Vaseline, in order to attempt to prevent the dissimilar metals from corroding and locking the keel in place.

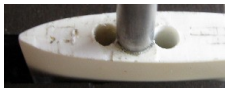
If the keel becomes unmovable due to corrosion it may be possible to force it out by flooding with penetrating oil and applying pressure. The boat should be supported at the keel box edges with a gap exactly equal to blade socket width. Loosen the keel nut 3 or 4 turns and put a bar across this with a couple of clamps that will press on the nut when they are tightened. Do this slowly while adding penetrating oil or similar.

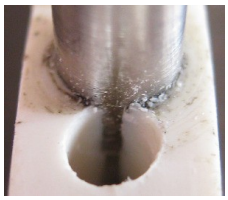
It may be useful to carefully drill or cut a small hole in the aluminium tubes between the deck and the servo tray and add additional penetrating oil with the boat held bow down so it can flow both ways.

The Rudder

Like the keel, above, the rudder shaft running in an aluminium tube can cause corrosion which will lock the two together. see 'The Rear Frame' above. It should be fitted with waterproof grease.The

rudder should be centred using the transmitter trim before sailing. Sight from aft along the rudder to the keel blade and test by operating the steering.



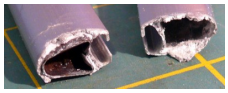


The rudder shaft can become loose in the rudder blade. To fix this drill holes in the top of the blade adjacent to the shaft ensuring that the plastic is removed to expose the shaft. Fill the holes with super-glue and work the shaft to get the glue between the shaft and blade leaving it aligned correctly.

The rudder cross bar has a brass boss set in a nylon arm. There is a small flat on the brass which is supposed to lock the two materials together. The nylon can become loose on the brass boss and this can allow the rudder to shift several degrees independently of the arm. It can be stiff enough to not be noticeable in normal handling but can shift under load when sailing. This leaves the rudder off centre and makes it harder to sail.

The cross bar can be repaired. I hammer in some brass shim alongside the flat to tighten the nylon.

The Mast



The jointer between the mast sections is probably some form of bronze alloy. This can cause corrosion of the aluminium mast section which can lead to breakage. The break will be at one end of the jointer or the other. The corrosion is usually localized, filing this away to clean metal may lose just 2 or 3 mm. A piece of aluminium bar, a few inches long can be cut and filed to fit at one end into the mast and the other into the jointer to rejoin the mast. When I have done this, twice on one mast, I apply liberal amounts of epoxy resin or glue to ensure that there is a tight fit and that water is excluded.

The mast head, foot and boom fitting can become permanently fixed to the mast. The sail then becomes locked in the bolt rope slot. This can be resolved by cutting away the track for a short distance at the top of the mast. Ensure that this is finished smooth to avoid damaging the sail as it is removed or replaced.

The Sails

The battens tend to come unstuck in heavy winds. Some adhesive tape, preferably clear white tape, can be stuck over the ends of the battens. If some battens have been shed then they can be replaced using thin plastic strip cut from some packaging using double sided tape. The containers used for Chinese takeaways has been recommended to me.

The bolt rope on the mainsail may be too short and fail to hold the head or the clew correctly. It can be replaced by attaching thread to it before pulling the old one out and then using this thread to pull the new one into place. This rope can also drop down leaving some of it below the boom and missing from the head. A stitch or two at the head will hold it in place.

If the bolt rope fails to hold the sail in the mast groove at the clew then tie a string through the clew and around the mast.

The Booms

In close racing the cleats on the booms can catch on other boats. By moving them forward so that they stay within the deck line, or putting them on top of the boom, then even when the sails are fully out this can be avoided.

Rigging

The rigging line supplied should be used as this has low stretch characteristics and is very strong.

Knots and free ends can be sealed with a small drop of 'superglue'. This prevents knots coming undone - permanently - and line ends becoming frayed.

Sails and Battens

Battens can shake loose from the sails. Adding clear adhesive tape at the leading edge and around the leach will help keep the battens attached.

If battens are lost they can be replaced using thin plastic, as found for example on packaging or food containers, and double sided tape.

Appendix 1 - Materials

Epoxy Glue

Epoxy is a 2 part glue that provide a strong bond for a variety of different materials. The 2 parts are resin and hardener and these are mixed, usually, in equal proportions. It can be bought in double tubes that help keep the parts equal by extruding both tubes at the same time.

Different formulations give various setting times. The one illustrated is '5 minute' which gives 1 minute working time and then is set is 5 minutes and completely cured in 30.

Surfaces must be prepared by removing all trace of oil, paint or moulding release and, preferably, roughening the surface with fine sandpaper and removing all dust.

Care must be taken in its use.

Epoxy Putty

Epoxy putty has a putty like consistency and comes as a tube with the hardener in the centre and the resin outside. A piece is cut off and kneaded to mix it thoroughly and then it can be pressed into position.

Surface preparation is as for epoxy glue.

Polyester Resin

Polyester resin comes as a clear liquid in a tin. It is activated by mixing in a small amount of catalyst. If too much catalyst is used the resin can set too fast and heat up which can damage the ABS plastic.

Fibreglass cloth

Fibreglass cloth can be used to reinforce or repair. It can be set in epoxy or polyester resin. For small patches using epoxy glue is suitable. It can be applied in several ways: wetting the cloth first and putting it in place; applying a coat of glue to the surface first and pressing the cloth onto this then applying more resin or glue after the cloth is fixed by the glue setting.

Gloves should be worn to avoid getting glass in your fingers and to keep resin off the skin.

Appendix 2 - Reference Material

Documents:

Seawind Building Instructions
Addendum to Building Instructions
Waterproof Hatch for Seawind

Upwind Newsletter Articles:

Seawind Maintenance - Upwind May 2007
Leaking Boats - Upwind September 2007
Club Boat Diary - Upwind October 2007
Leaking Rudder Post - Upwind December 2007
Better Battery Wiring - Upwind March 2008
Back to Basics, transmitters and frequencies - Upwind June 2008
Carbon Fire Seawind, a first look - Upwind June 2008
Why buy a Carbon Seawind - Upwind June 2008
Cracking Servo Posts - Upwind December 2012
Capt Tolley's Creeping Crack Cure - Upwind December 2012
Yet Another Mast Repair - Upwind December 2012
Black Wire Disease, Black Wire Rot, Black Wire Corrosion - Upwind Dec 2012
Buying a Seawind - Upwind October 2013
Things that Break - Upwind October 2014
Fixing the Rudder - Upwind December 2014
Batteries and Chargers - Upwind October 2015

Weekly Report items:

Seawind Rebuild episode 1 - Sailing August 9 2009
Seawind Rebuild episode 2 - Sailing August 16 2009
Seawind Rebuild episode 3 - Sailing August 23 2009
Seawind Rebuild episode 4 - Sailing August 30 2009
Avoiding snags - Sailing September 20 2009
Avoid Catching Other Boats - Sailing September 27 2009
Club Boat Servo Tray - Sailing December 6 2009
100's Keel socket - Sailing December 27 2009
100's Rudder - Sailing December 27 2009
Keel Removal - Sailing August 22 2010
Rudder Problems - Sailing October 3 2010
Rudder Shaft Problems - Sailing October 24 2010
Another Rebuild of 01 - Sailing December 12 2010
Range problems and Servo Tray - Sailing November 6 2011
Boat Racks - Sailing July 22 2012
Rebuilding 19 - Sailing November 30 2014
Repairs to 1 - Sailing January 11 2015
Mast Support - Sailing November 8 2015
Mast Support 2 - Sailing November 15 2015
Bubble Hatch - Sailing November 15 2015
CFE Defects - Sailing December 29 2015
Yet Another Rebuild of 1 - Sailing January 10 2016
Rebuild of 1 part 2 - Sailing February 21 2016

Battery Box substitute - Sailing July 31 2016
5 Cell Batteries - Sailing November 13 2016

Special reports:

Report on Carbon Fibre Damage
Damage to Seawind Prada 01
Seawind Rebuild 100

Magazine Articles:

AMYA Model Yachting Issue 140 Special 2005

- Building the Seawind.
- Travelling Case for the Seawind.

AMYA Model Yachting Issue 169 Spring 2012

- Building the Seawind.

AMYA Seawind Express

Ball Joint Free-up - SWE6
Boom Vang, Adjustable - SWE6
Boom Vang, Adjustable, Spring Loaded - SWE16
Hatch Cover, Prototype Sliding - SWE7
Hatch Cover, Upgrade Available (described) - SWE16
Hatch, Waterproof, Ideas - SWE2
Jib Boom, Adjustable - SWE1
Keeping Your SW Shipshape (checklist) - SWE6
Mast Compression Strut - SWE8
On-Off Switch, Receiver - SWE13
Painting the SeaWind - SWE10
PVC Pipe Boat Stand - SWE9
Rudder Maintenance - SWE1
Sails, Care and Feeding Of - SWE14
SeaWind Rigging - SWE2
Travel Case - SWE3
Travel Case, Modified Golf - SWE12
Waterproofing Solution -- Aeroplate - SWE4