SILHOUETTE **MAKE & MEND** Sheets
No.1 **RUDDERS**

Editor: Ian Rodger

Rudder problems

Old Silhouettes are prone to wear, corrosion and rot in the rudder and tiller assemblies. This appears as:

1. **Rusted or broken lower rudder bearings (the gudgeon and pintle).**
2. **Water getting into the aft locker, seeping in where the rudder tube passes through the hog plank or moulding.**
3. **The rudder stock rusting and eventually siezing up in the rudder tube.**
4. **Excessive play in the tiller.**

If you have one of these problems, it is more than likely that you will also have the others and most owners have found it worthwhile curing all four at once. However, The lower rudder bearing is the most common problem of the four, and here is the way to deal with it (assuming that the skeg and rudder are in good condition, because it is a waste of time putting new ironware on soft timber). Tucker's drawings only show details of the rudder, skeg, and fittings on the inboard engine version of the Silhouette, with the rudder stock extending right down to a strong pivot on the heel of the skeg, as shown in fig.1.

If you are renewing the rudder stock, this is a stronger arrangement than is found in the majority of Hurley-built Sil's, where the rudder stock extends about 4" below the hull, terminating in a pair of curved cheek plates which bolt to the rudder. The lower pivot is usually a pintle bolted to the skeg, engaging with a gudgeon similarly bolted to the rudder blade, as shown in fig.2.

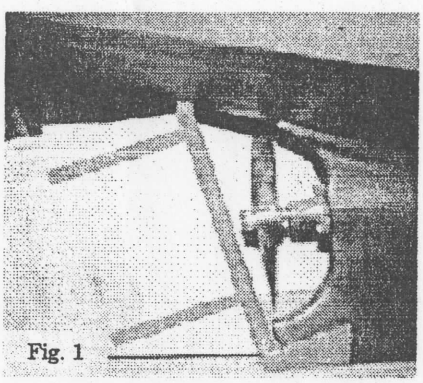


Fig. 1

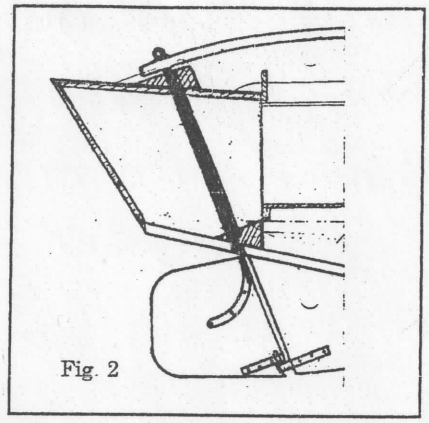
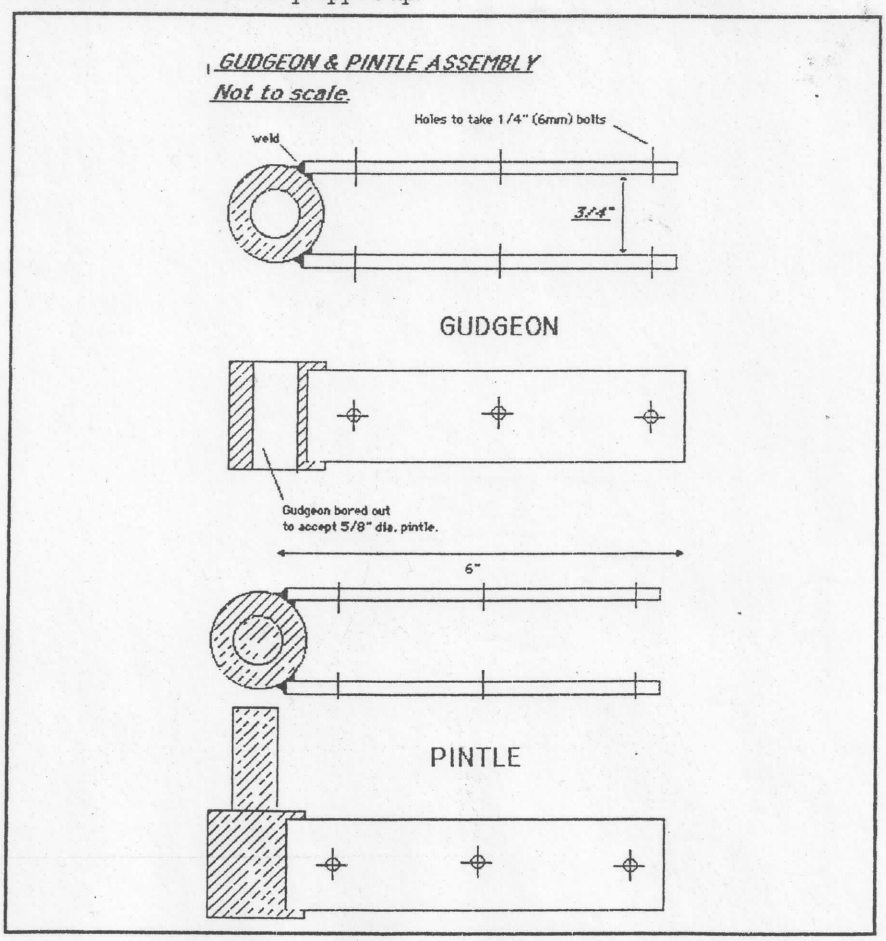


Fig. 2

Close inspection will indicate how much the pintle has corroded away from its original thickness, (it is usually the pintle, fastened to the skeg, which wears away in the centre part). If it is less than 3/8" thick, it should be replaced. If you need to remove the whole rudder and stock, the first thing is to jack the boat up for easy access to these parts. If it is on a road trailer, you really need another foot of height under the wheels, with the front of the trailer securely weighted or tied down, and the back end of the boat propped up.

Replacement

Remove the three bolts holding each of the fittings to the timber. These may need cold chiselling off and punching out. If there is a lot of play in the rudder assembly, you may be able to wriggle the rudder upwards far enough to lift the gudgeon off the pintle. If not, saw through the base of the pin to release the two parts. The rudder may then be forced sideways to allow the pintle to be withdrawn from the skeg, and likewise the gudgeon from the rudder. On some boats, the arms of these fittings are recessed into the timber of the skeg and the rudder, giving a flush surface, but making it difficult to remove either of the pair. If this is not the case, it is a much simpler job to slide the two fittings off, once the bolts have been removed. At this stage it might be worth removing the tiller and dropping the rudder stock to see if it has corroded. If it has wasted away to less than 1/2", you have a bigger job on.



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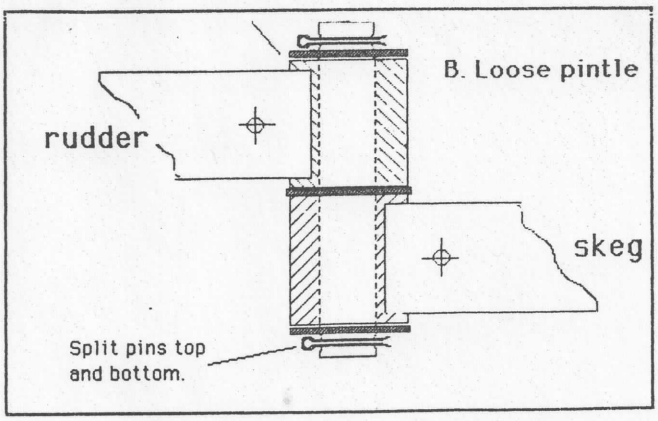
Making new fittings

If you have been able to get the old fittings off intact, they can be used as pattems for new ones. It may be worth beefing up the diameter of the pintle from 1/2" to 5/8" to give a longer life. Mild steel will do, preferably galvanised (allow for this in the machining). There is no advantage in making underwater fittings of stainless steel, since it will probab;ly react with all the other non-stainless metalwork on the boat.

If you were able to remove these fittings by jiggling the rudder upwards, it is possible that you will be able to install the new ones in the same way. If you had to destroy them, then you need to modify the design of the new ones to make assembly possible. For this, instead of an integral pin on the pintle, make the lower fitting a duplicate of the gudgeon, with a loose pin passing through both units, secured top and bottom with stout split pins.



Replacement

If the fixing holes on the new fittings don't exactly match the originals, plug these with dowels and align the new parts in the correct position before drilling new holes. These can be drilled slightly oversize, to allow for any necessary adjustment, but pack the bolts in with plenty of waterproof grease to preserve them. Loosely bolt the gudgeon to the rudder plate, then the lower fitting to the skeg, and pass the pin upwards through both parts.

Finally, test the rudder action. If the two fittings are not in line, there will be uncomfortable resistance at the tiller, and unnecessary strain on the skeg and rudder. Secure the pin, then tighten up all bolts and grease well.

Rudders and inboard engines

If an inboard engine is fitted the skeg will be thicker (probably 2" thick) than normal, and the rudder will be supported as shown on Tucker's drawings, or as in the photo in fig 1. If you are doing away with the inboard engine it is worth retaining the rudder hangings, but blocking off the propeller aperture, as leaving this open will seriously affect the boat's ability to point to windward. The best way to do this is to make a fillet piece from plywood which tapers from the thickess of the skeg to that of the rudder blade.

MkIII Rudder fittings

In production, Hurleys moulded the rudder round a vertical steel rudder stock and tube running up the rear of the aft cockpit bulkhead. A machine head on top, allows the tiller to lift.

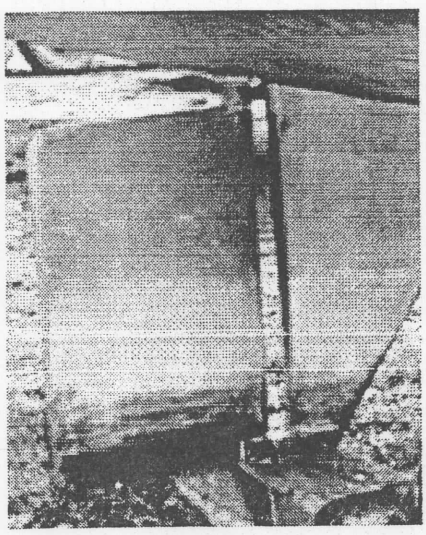
A skimpy lower pivot made of mild steel strip connects the rudder to the small skeg, and is prone to damage and corrosion.

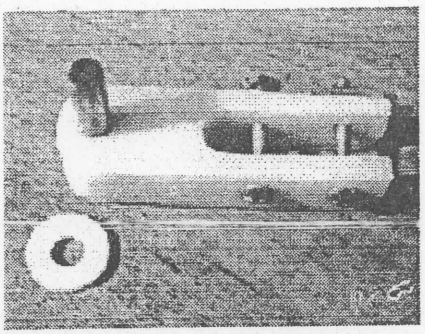
The rudder stock is made of 1" stainless steel, but may pass throiugh a mild steel tube, as siezed rudders are sometimes found in neglected Mk III boats. The lower end of the stock is either machined down to 1/2" dia for the last 2", or has a 1/2" dia stainless pin let into it (may be screwed in).

This pin rotates in a mild steel gudgeon made from 1" x 3/16" mild steel strip - undersized and incompatible. On most boats, the original fitting will not have survived, or if it has, it should be replaced.

Although you would expect the skeg to give some support to the rudder, ther reverse is the case here. The strong 1" dia. rudder stock protects the skeg, particularly when pounding on hard sand.

The rudder blade is moulded in two halves. Check that it is still integral and that there is no play on the stock. If it has split, dismantle as carefully as possible and check that the arms welded to the stock are not rusted. Repair as necessary and resin the halves of the blade back in place.





Replace the pintle & gudgeon with a more sturdy version. As an alternative to steel, try Nylon 66. This is an engineering grade plastic, available in 1" thick block and you should be able to locate it at an engineering suppliers and buy an offcut fairly cheaply. The version illustrated opposite came from a piece about 1 1/2" x 5". It can easily be cut with a hacksaw and then driloled to take the 1/2" dia pin. You can either make this an integral part of the plastic gudgeon, and drill a loose fit hole up the length of the rudder stock to accommodate it, or fit it tightly into the stock, with a loose fit in the nylon. The first option is probably the most long-lasting in terms of wear.

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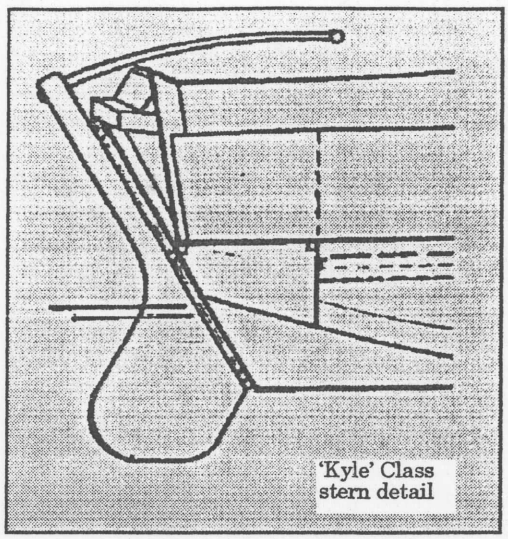
Some mavericks...

- might spark off some ideas

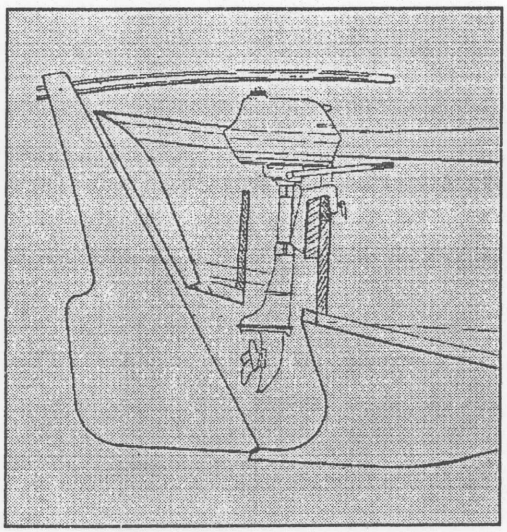
Transom-hung rudders

Some members have been tempted to do away with the standard SII or SIII rudder and to substitute a transom-hung rudder instead. Robert Tucker also designed the 'Kyle' class cruiser, which is dentical in profile and overall dimensions to the S II, but with a double chine hull. The cockpit is extended to within a foot of the transom, and a transom-hung rudder fitted, as shown opposite

Presumably this is a lift-off type, as it would be too vulnerable as shown, projecting well below the skeg. As with the next idea, the tiller needs to be excessively long to clear the stern locker and be within reach of the helmsman. ***Not*** ideal for efficient hull trim, and not really a recommended modification.



'Kyle' Class stern detail



One member experimented with a similar arrangement shown here. An engine well was built into what was the stern locker, and a transom hung rudder substituted for the original. Rather a delicate and vulnerable skeg in this case, but probably o.k. if a steel shoe is fitted to the underside.(Note: the boat would be ruled 'out of class' in Silhouette races!)

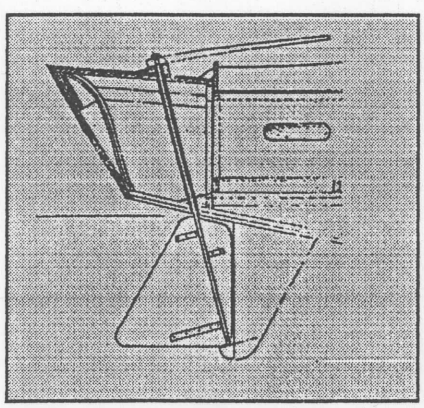
Possible advantages claimed for this arrangement were:

- Better engine control access.
- Propellor is in front of rudder (giving better steering control).
- Engine cannot be swamped.
- If covered with a locker top, there is better security against theft.
- Engine is easier to work on when mounted on boat.
- Propellor less likely to foul other craft etc.
- Propellor is always in the water.

Possible disadvantages:

- Need to ensure adequate air inlet for engine
- Exhaust fumes may drift back into cockpit
- Need to split backstay and fit new attachment points on outer edge of transom
- Prop always in water so causes drag when sailing

This hybrid rudder arrangement appears in an early edition of Tucker's plans for the SIII. The larger rudde rblade and vertical rudder tube subsequently adopted are an improvement on this, bu the small skeg remains a vulnerable feature of the SIII.



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