INTRODUCTION

Many people have written about the faults with Atalanta rudders, and with very few exceptions have been critical about their design. In order to get this into perspective very few people complained about mechanical failure before 15 years. When we look at the catastrophic failures of many dagger, fibreglass laminate and single pivot rudders fitted to modern boats after only one or two seasons use, the Atalanta rudder, with its sophistication and versatility seems to last very well. Unlike these sealed laminates of stainless steel wood and GRP, expensive X-Ray or-extensive surgery is not required to check its integrity, a few hours work with spanners will reveal most faults. If these bolts are seized solid, and take a little longer to free, then in my opinion this shows the job is many years overdue, but is little consolation to a new owner! Unlike a dagger rudder boat 1 have yet to meet an Atalanta who has lost it's rudder through running aground, most loss of rudders have been through one of four causes

1. Operator error (drying out with rudder lowered)
2. Corrosion of rudder and/or pintle
3. Corrosion of skeg mountings
4. Metal fatigue (age, incorrect, abuse or poor design)

Of the above causes I will only concern myself with causes 2 - 4 inclusive, although as regards 1 the author must confess to several close shaves himself!

CORROSION PINTLE

The lower pintle of your rudder where it is bolted onto your skeg may look fine, especially where it is covered with 30 layers of TBT. On the inside this may be a very different tale. After having removed mine in order to replace the skeg. and having observed the grit blasted lace curtain with horror, I showed the article to Jane Stearn (A183) who was also replacing their skeg, who commented their boat was considerably newer than mine(A16) and was probably OK. When it was removed it was in fact worse. Since then several owners have found the same, If you remove it, have it industrially gritblasted before inspection, if taken in and paid cash it is very unlikely to cost more than a fiver, and is the only practical way to remove the corrosion. This is also very necessary if it is to be repaired. by 'FIG welding, MIG in this application is not generally satisfactory.

The cause of this is electrolytic action. The webs were bolted through with stainless bolts on some boats, and even worse, with copper rivets on some of the later ones. I gave much thought to replacement bolts, even considering alloy bolts, but eventually used well greased A4 stainless bolts, A183 also did the same. I saw no advantage in copper, and only time will tell if this was the right decision. If it lasts another 30 years I will be well satisfied.

I had the pintle repaired by a local aluminium welder using gas preheating and TIG welding using two offcuts (N8) from a replacement rudder blade. I must emphasise that the only way to inspect this part is to remove and gritblast as the corrosion is nearly all on the inside. This will also be necessary to have it welded. You ignore it at your peril! A small hole (about 2mm) drilled through the outside of the pintle cheek may give some indication if a hand drill is used, the thickness should be 3/8". Incidently the rudder pintle pin on the later Atalantas (type3) are of 1" stainless steel let into the aluminium fabrication, on those I have seen there was no evidence of corrosion around this part.

RUDDER STOCKS

Corrosion of the blade has one simple remedy, replacement! Any other course of action is expensive, unreliable and dangerous.

There are two different types of rudder stock fitted to Atalantas, those of welded construction, and those of riveted. The earlier riveted seem to have the most problems. They were formed of three main sheets of N8 aluminium, riveted together with 3/16 aluminium rivets, the top pintle and operating arm going through the transom being the only welded part. The bottom pintle bush was held in with the strap by countersunk aluminium screws. In line with other Fairey designs minor variations on this theme may be found. The main problem with this design is that expansive corrosion sets in between the sheets, causing swelling of the cheeks, weakening of the structure and most seriously shear stress on the top weld. Failure of this weld results in instant loss of all the rudder gear and any steering. In my opinion this aspect of the rudder design is the weakest design point.

The other faults this swelling causes is:-

a. Loose fit of blade resulting in downhaul wire being trapped between blade and stock.
b. Loose fit of blade giving shock loads to structure, giving rise to further stock damage and rapid crack fatigue of rudder blade, especially when rolling.
c. Increased wear in ovality of pintles as out of true.
d. Risk of weld failure as outlined above.

The cure for this is not easy, the only consolation is that it will not need redoing for many years afterwards. The cure is either time consuming or very expensive. There was no choice for me, but it took less time than expected. There are two solutions in most cases, replace or repair. Mine was borderline, and I chose to repair. Although it has lasted two continental voyages, rough weather and five seasons use without any visible deterioration, I sometimes wish I had replaced, it would have been more expensive but easier.

I cut off the top plate, lower pintle bush and after gritblasting drilled out and removed the rivets holding the main plates together. I then had the plates gritblasted and inspected, there was extensive corrosion on the inside spacer. I was set to replace these, but the firm who gritblasted offered to aluminium metal spray the plates for a fiver, so I succumbed to the temptation! They added about 7Kg to the weight, much of which had to be removed with an angle grinder subsequently. I then "V" ground out the joints with a 4" angle grinder to a depth of 5/16" and a local firm who repair racing gearboxes TIG welded it all together again, no rivets! Acting on advice I had it gritblasted again, and while it was still hot sprayed it with 'Hammerite'. Was not sure about this, but have had little success with etch primers. I used the reasoning that I could always have it gritblasted off next year if the paint adhesion failed. However five years later it is still perfect. The improvement in handling, uphaulldownhaul, smoothness, and lack of worry has been worth the work and 4;60 cost. Make sure that any firm who welds it preheats with gas before welding as this ensures good penetration, and reduces stress. This is not so important on new material.

The cost of aluminium to make a new stock is about £140-00 at present rates, however one could utilise old rudder blades of which members seem to have several. One can cut it very easily using an INDUSTRIAL Bosch jig saw and Bosch T127D blades. I have found no good equivalent blades, either Makita or Hitachi, but the saws are comparable. One blade cut out three rudder blades using paraffin as lubricant. The aluminium was clamped by a body standing on it on two pieces of 4" X 3" timber. WEAR GOGGLES. The rest of the action is as above. These saws can be hired cheaply for a day. Each plate takes about 20 minutes to saw out, SEE NOTES ON DESIGN AND FATIGUE. Drill the pivot hole after welding.

The more recent welded stocks do not seem to suffer as much, I would be interested in hearing from any owners of this design who have this problem, and I will revise this article.
While on the subject of rudder blades, I fail to see the advantages of a 2" stainless bush (note NOT 50mm) in an aluminium rudder assembly with a dural rudder pivot bolt. There is a risk of failure in these old bolts, through stress corrosion and old age. In view of this large mass of stainless, I replaced my bolt with a 25mm A2 stainless bolt with a tube spacer, this limits the compression of the cheeks to the correct gap, I feel happier about the strength, I am not frightened to do it up really tight, replacements are easily available, and I have no obvious increase in corrosion. I do however have anodes on the stock and rudder blade. Those worried about corrosion in this area and who wish to retain a dural bolt should consider replacing the stainless bush with a bush of tufnel, delrin or similar suitable inert material.

SKEG CORROSION

Wood rot is not covered, the more common corrosion is metal.
The.skeg is attached to the boat by a combination of glue and galvanised coach screws of large proportions <8" X 5/8"). While when they were new these from a strength point of view were more than adequate, if you add to the equation many years, rust, wood softening and movement owing to seasonal drying and wetting then there is a real risk of the skeg parting company with the- boat. If there is ANY detectable movement when force is applied to the bottom of the skeg, or a crack or gap can be seen between skeg and boat, then this should be investigated without delay. Several owners have lost their skegs and rudder through this cause. used a suitable piece of IROKO as a replacement, cost about .t12-00. Until now I have had to have the coach bolts made by a local bolt manufacturers at a cost of t25-00 for 20, however last year I noticed that F Webb, Pin Mill, Chelmondiston, Ipswich, Suffolk had some for Thames Barge repairs. A reversed 3/4" drive socket will drive these bolts without difficulty. Through bolting the vertical section of the skeg to the transom with stainless bolts also has some advantages above galvanised bolts. They do not rust so removal for inspection or tightening is far easier. There may be arguments over crevice corrosion, you pay your money and take your choice!

When I came to inspect mine I found that in addition to the coach screws there were two very long 5/8" Phosphor _Bronze bolts through the hug and skeg. This seems to be a very good design, enabling the skeg to be tightened if it works loose. I would strongly reccommend this modification to anyone.< Thank you Aubtiu (Clarlance) Farrar, who put my boat together in 1956) These bolts were made with 5/6" rod with a die run down each end. If I could not obtain Phosphor Bronze I would use 316 stainless bar in preference to galvanised mild steel, and would use a protective grease [see diagram) Again a time consuming but inexpensive operation.

METAL FATIGUE ETC.

When making any part it is very important that any part which carries stress or flex is made of the correct grade of metal. This is 'especially true of aluminium alloy components, The recommended alloy for rudders is h6 condition M, To try and use N6 condition 0 is a waste of time, effort and money. The increased flex owing to its soft condition will rapidly induce fatigue and cracking, often within one seasons use. It should be noted that cracking in metals frequently proceed at supersonic speeds!

When machining or cutting in stress areas it is essential that all corners and sharp edges be avoided. Do NOT cut to right angles with the jigsaw, but allow as large a radius as possible. The increase in stress and subsequent failure is increased many thousand fold if this is not observed. Many rudder blade failures can be attributed to failure to observe the above precautions.

It must be remembered that leaving the rudder blade up when on a mooring induces considerable extra stress in the blade, unavoidable when on a drying mooring, as does failure to lower the blade to its full extent, giving very heavy helm and stress on the whole structure of the rudder. Mud and grit from drying moorings do not help this, and a. push with the boathook often helps. Both the above shorten the life of the blade and must be regarded as mooring expenses.

If the rudder assembly is over 25years old, or if the skeg has worked loose at any time causing chafe at the top of the transom, then the plate weld at the point where it comes through the transom should be regarded as suspect. Failure of this weld is catastrophic as loss of the rudder assembly complete results. In my opinion this is the weakest part of the design as there are no emergency measures you can take; apart from the danger there is considerable expense and inconvenience. It is more expensive to have it tested than to get it dismantled, gritblasted, and rewelded using preheating and TIG welding. It is worth remembering that aluminium alloys have a finite stress life.

ALTERNATIVES

Bearing in mind how well these have lasted I do not see that for most of us there is an alternative that will be viable in terms of expense, time or, maintenance. It has stood the test of time, and there are no dramatic improvements in cheap materials. Epoxy GRP and Kevlar are no great improvement, and titanium is expensive and difficult to work. The extra weight and inertia of a steel blade would cause me some concern as to the stresses caused to the transom attachment of the boat. The best alteinative I have seen. was on A6, where a steel frame housed plywood infill, this was done for expense saving. I do wonder what would. happen if the plywood came out, however there is little difference between steering with an egg-whisk and no blade! Again this variation has stood the test of time. I would be interested in any owner who has had an alternative in use for more than three seasons and covered over 200 sea miles.
If any member wishes to contribute towards this, please feel free, even to violently disagree, I have tried to keep this as non technical as possible, while trying to give as much information as is helpful. If anyone wishes to contact me for advice or a chat, please feel free to phone.

Finally, we are here to sail boats, not Just to work on them!

Martin Bennett A16 DERVORGUILLA
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