

The Keel

OUT OF SIGHT, OUT OF MIND... ALWAYS A FACTOR



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IS THE KEEL the most often ignored part of your customer's boat?

Here is a profit-making, customer benefit idea for our readers in the marina, yacht club, repair yard and brokerage businesses. The suggestion is to promote keel maintenance and repair. Your customer's lead keel is out of sight and out of mind almost all the time, but it is always a factor in the boat's performance, handling and safety.

The lead keel on your customer's sailboat is working at all times, stabilizing the vessel at rest and giving it directional stability underway, but if it's been bent or damaged, it may be fighting the helm every mile of the way.

Let's get the good news out on the table right away—a damaged lead keel can be repaired in most cases.

We say "in most cases" because there's an economic reality involved. As the boat ages, its value drops. A keel repair on a relatively new boat might be a cause of upset for the owner but economically, it's probably well justified given the value of the vessel.

The cost of a keel repair becomes more and more significant as the value of the boat drops over time, to the point where an owner may deem it not worthwhile.

IMPORTANT POINT NUMBER 1

Just because it's out of sight and out of mind does not mean that the keel does not need to be checked regularly. At any age, immersion in water, sailing stresses (knock downs), sailing mishaps (groundings) all contribute to the need for regular maintenance of the keel.

If water penetrates through the hull keel joint or through a flaw in the barrier coat on the keel, the freeze-thaw cycle of winter storage can do significant damage the keel over time. Water intrusion, even in small amounts can promote oxidization of the keel bolts, as well as can deform the lead as trapped water inside the keel pushes the lead out causing "blister" like deformations on the keel. This action of the water and ice can lead to a loosening of the bolts hold on the lead.

INSPECTION AND MAINTENANCE

Encourage your customers to realize that best route for any boat is seasonal maintenance starting with an inspection of the keel in the fall when the boat is hauled out. It should be carefully examined for any deformations, blistering, cracks or problems in the paint and coating and of course, any evidence of corrosion, or of the keel actually being loose.

Problems fall into three main areas; keel surface concerns, keel bolt deterioration and casting deterioration. More on inspection and maintenance in a moment...

WHAT CAN BE DONE FOR A DAMAGED KEEL?

Keel repairs that can be done by the boat yard include repairing the barrier coating on the surface, repainting the keel, re-bedding the keel in the sump, re-torquing the bolts (this should be done with extreme caution based on the age of the bolts and their unknown condition, they could be badly corroded and fail if tightened). Projects that have to be sub-contracted to MarsKeel Technology are replacing bent or corroded bolts, straightening bent or twisted keels, removing oxidized lead and refusing fresh lead to the old keel and for many boats, the extreme option is a totally new keel.

Left: MarsKeel president Kevin Milne is seen here in the loading area of the MarsKeel facility in Burlington, Ontario. The company ships new and repaired lead keels world-wide.



This CNC 34 suffered a whole list of problems including bent keel bolts, impact damage and a twist to its keel.



You can see both the twist and the impact evidence on this keel.



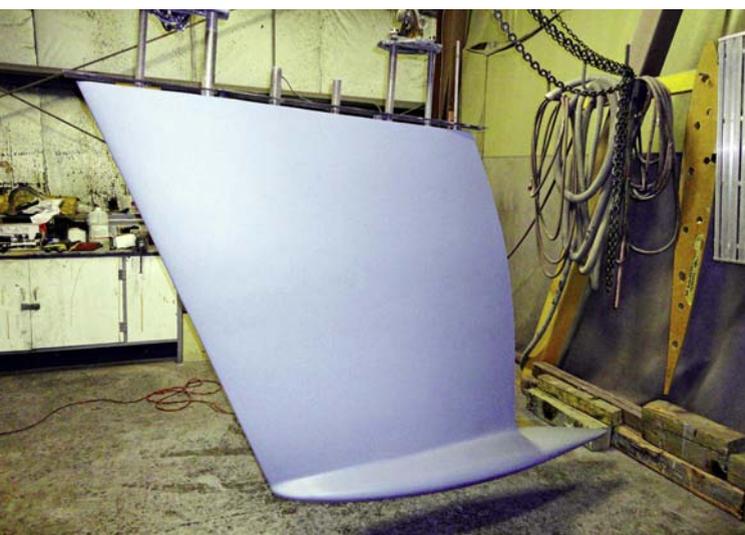
This is a closer shot of the bottom of the keel showing the area where the impact occurred.



The team at MarsKeel has removed the keel and it is lying on it's side in the huge press where the twist and bend will be straightened.



Now straightened out, the team at MarsKeel have ground off the barrier coating and paint, burned out the bent bolts and will refuse new lead around new bolts to return this keel to basically like new condition.



Ready to ship back, this keel is like new and ready for final painting.

In addition to repairs, existing keels can be modified by adding bulbs to alter weight and performance characteristics. There are also draft reductions where an existing keel is cut down in size and a bulb is added to maintain the correct weight.

WHO CAN DO THIS SORT OF KEEL REPAIR OR MODIFICATION?

There is only one company we know of that can offer you and the owner complete keel repair and maintenance, MarsKeel Technology. They have a remarkable facility in Burlington, Ontario and are the leading lead keel specialists in the marine industry.

Founded some 35 years ago by company President Kevin Milne, MarsKeel operates internationally and is so accomplished that even custom yacht builders in such far-flung locations as Turkey or South Africa, get their custom keels from MarsKeel.

The company grew from his father's metal business and their expertise working in lead, at a time when the yacht building industry was booming in Ontario and companies like C&C Yachts, CS Yachts, Whitby and many others were looking for a reliable supplier of lead keels.

The business grew rapidly and MarsKeel became established as the supplier of choice. Today, the company has some 250 keel molds on hand to build replacement keels to OEM specs. In fact, MarsKeel has been supplying production keels to just about every known builder in North America over the last 35 years.

Kevin Milne is a living "keel encyclopedia" and he has a seasoned team that has faced just about every challenge a keel can pose. They have an in-house molding capacity up to 200,000 lbs and MarsKeel also does 50 keel repairs or modifications a year. There is a wealth of knowledge to draw on at MarsKeel and they can assist you in the maintenance and repair of your customer's keels.

We visited the MarsKeel facility to interview Kevin Milne and also Bill Souter who heads up Custom Keel Sales & Design. We learned a lot!

KEEL INSPECTION STEPS

First, visually inspect the keel when the boat is hauled out in the fall. There should be no looseness or gap between the keel and the hull as the boat is lifted out. Check to see if there is water weeping out. Does the keel "wiggle"? This could be a keel concern or a structural concern of the hull.

Is there a corrosion trail on the outside of the keel, leading typically from the hull keel joint down the side of the keel? Even stainless steel bolts will corrode if water is present and no oxygen can get to it (for example in an area where the bolts go through the FRP sump of the boat).

Keel surface concerns often are the result of accidental damage such as groundings, strikes and general deterioration. Look to see that the keel is fully protected by a barrier coating like epoxy, or polyester fairing material and paint. There should be



no scraped or bare areas.

Lead is very stable and deterioration takes place slowly, but surface damage can expose the very small trace amounts of other metals present in the casting alloy. These can be a fraction of a percent of the lead in the casting but these can break down and cause major damage over time.

Water will loosen the fairing on the keel if the surface damage is left unattended to, so this needs to be repaired, but lead can be dangerous if swallowed or inhaled so working with lead is best left to a specialist like the team at MarsKeel Technology.

Then, check inside the boat. Is there water in the bilge, or in the sump as you haul it out? Are the keel bolts loose? Is there visible corrosion?

Remember, water can enter through a number of other sources, not just the keel and sump. Rainwater can be coming down the mast and into the bilge, there could be a leaking deck fitting, an open port or hatch, water leaking from the stuffing box or from a through hull fitting or plumbing connection.

CAUTION ON TIGHTENING BOLTS

Keel bolts can be re-torqued to original specifications, but MarsKeel's Bill Souter cautions us, "On an older boat, perhaps 20 to 25 years, the seal in the hull keel joint may not be intact, so don't tighten the bolts without a very careful inspection of their condition. This might require lowering the keel to check for

Here we see a before and after shot where an existing keel was reduced several inches in depth and a new keel bulb was added.



This is the keel off a 70 Hylas and the damaged barrier coating has allowed significant oxidization in the lead around the keel bolts.



This shot is closer and reveals the oxidized lead looks like crumbly soil, not metal. The damage is extensive.



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Now turned on its side, the experts at MarsKeel burn out the bad areas to replace the bolts and refuse new lead into the keel.



Looking like new, this badly damaged keel will perform for years to come with regular maintenance.

keel bolt deterioration. Otherwise you risk breaking a bolt, especially when there is evidence of corrosion.”

If the keel needs to be loosened for re-bedding, or removed for repair, Souter emphasizes that the keel should first be securely stabilized in a frame or brace, then the nuts are removed and the boat lifted off the keel.

Just like a grounding or strike when sailing, cradle collapse, such as when the boat is blown over on the hard during a storm, can cause significant damage including bending or twisting.

Twisting the keel back into shape requires very special measurement and handling. MarsKeel uses a variety of presses up to a 1,000 ton press to return a keel to its true shape.

For most significant repairs, your yard or facility will need to drop the keel. If your yard is not familiar with the process, needs more assistance in evaluating the keel's condition or to prepare a keel to be shipped to MarsKeel, just call them. The number is 1-800-381-5335 or go to their website at www.marskeel.com.

MarsKeel has shipped lead keels all over the world so getting a keel to their facility in Burlington, is a familiar task for them. To learn more about keel damage, keel repair and to see more examples of what your yard can offer to assist your customers who have keel problems, visit: www.marskeel.com.