



Inspecting and Surveying a Used Sailboat

Once you have found the boat of your dreams, or a close approximation, you'll have to determine whether it's in relatively good shape, or if it suffers from any major problems or defects.

This is important because boats on the used market are starting to get a little old, and the potential for buying a disaster is very real. Unfortunately, repairs or other measures to correct a major problem can be very expensive. For example, the cost of eliminating serious osmotic blistering on the bottom of a hull, replacing a rotten wood core in large areas of the deck, or repairing cracked keel supports can equal the price paid for some of the older boats in the 25 to 30 foot range.

On the other hand, it is normal for most sailboats on the used market to have a number of not-too-serious problems, and to be in need of some repairs and upgrades. Examples include replacing the hoses and hose clamps on all thru-hulls, upgrading parts of the plumbing or electrical systems, rebedding the windows and deck fittings. More substantive, but still feasible repair jobs would include epoxying the bottom of the hull to deal with mild to moderate osmotic blistering, and rebuilding a rudder that has become water logged.

It is also worth noting that attitudes have also changed as the used sailboat market grows older. Fifteen to twenty years ago the recreational fleet was still relatively new, and people tended to view the onset of even mild cases of osmotic blistering as a sign that a boat was almost a total write-off, and that it could only be sold at near give-away prices. The same was true if the wood core in parts of the deck showed slightly elevated moisture readings. Today, elements of these problems are often regarded as routine occurrences on many boats on the used market, as long as they aren't too serious. Nevertheless, buyers should make sure that they know the extent and nature of any problem, and the cost of, and the type of repairs that may be required.

Determining the condition of a boat while shopping on the used market is really a two step process. The first involves a thorough inspection of the boat by the prospective buyer, and the next step is to have a professional survey conducted after you have made an offer for the boat, but before you close the deal and take possession of the vessel.

Your Inspection of the Boat.

Your first task when viewing a boat will be to determine if it meets your needs, if it's well equipped, if it is sufficiently roomy and comfortable, and above all else, whether you like it. (Buying a sailboat should never be an entirely rational decision.) You should then be prepared to do a quick inspection which may take up to half an hour. The main objective of this exercise will be to decide whether it's worth making an offer for the boat and spend money to have it professionally surveyed.

Your eyes are the main tools for such an inspection, but a small knife or screw driver can be very handy for poking and scraping (be careful not to do any damage or leave any permanent marks on the boat). Although not absolutely necessary for a quick inspection, a flashlight and small mirror can be useful. You should also have a piece of paper and pencil to keep track of anything that you find questionable and will want to bring to the attention of the surveyor.

The hull, keel, and rudder.

Chances are that you will be viewing and inspecting the boat while it is stored on land. While this precludes the possibility of a quick test sail, it does allow for the inspection of the boats below the waterline. In fact, a complete survey by a professional will require that the boat be out of the water.

It's usually a good idea to begin your inspection with the outside of the boat. Step back and view the boat from

a distance. Does it appear to be well supported by its trailer, cradle, or jackstands? Stand in front of the boat and visualize a line from the bottom of the keel through the boat and up the mast. Does the keel appear to be in line with the rest of the boat? Walk around the boat with the side of your face right next to the hull. This will allow you to see the sheen on the hull and detect any distortions which could be a sign of repairs or stress areas. Make a note to check any area which looks unusual from the inside.

The keel and rudder should also be inspected. A repair job or damage on the bottom part of the leading edge of the keel is an indication that the boat has been involved in a grounding, a common enough occurrence for boats which sail in shallow bodies of water. Depending on how the boat is constructed and the severity of the grounding, this may be nothing to worry about, or it could be an indication of more serious damage in other parts of the vessel (a surveyor should be able to figure this out). Also check the hull-keel joint. If the joint appears to be wider at the forward end, it could be further evidence that the boat was involved in a hard grounding. If you are looking at a trailerable boat with a swing keel, try to get under it to take a look into the keel housing (a flashlight will come in handy for this).

Give the rudder a good shaking to see if the pintles and gudgeons (hinges) are worn or have become loose, or if there's too much play in the rudder stock. Swing the rudder back and forth to make sure that it moves freely and has not been damaged in any grounding or collision with floating debris. Note that it is common for rudders on older boats to have absorbed moisture over the years. This can cause damage with freezing and thawing cycles over a number of winters. Some people successfully deal with this problem by using a fairly long drill bit to make one or two small drain holes in the bottom edge of the rudder in the fall. They plug up the holes with an epoxy mixture in spring. But sooner or later most water-logged rudders will have to be rebuilt in order to ensure the boat is fully seaworthy.

A priority will be to look over the hull for any osmotic blistering (pox), a condition where very small pockets of water form in the fiberglass, usually just under the gelcoat. These can develop anywhere on the fiberglass hull below the waterline, and it should be pretty easy to spot a serious case of blistering. However, mild cases may only show up as a limited number of barely noticeable pea size blisters, and they can sometimes be difficult to spot through several layers of thick antifouling paint.

A good place to check for signs of osmotic blistering is the area of the hull immediately around the cradle pads and the supporting bunks on a trailer. Since these pads and bunks are usually covered with carpeting which absorbs water every time it rains, the hull next to them tends to be in contact with moisture even when the boat is stored on land. In theory, osmotic blistering will first show up in areas of the hull which have more contact with moisture (but this is not always the case).

Mild cases of blistering will not affect the seaworthiness of the boat, but it should be repaired because it tends to get worse over the years. Serious cases of osmotic blistering can reach a point where it will affect the integrity of the hull. It is possible for boat owners to repair osmotic blistering by sanding the bottom of their boat into the gelcoat and applying an epoxy barrier such as Interprotect 2000. This can be a very dirty and tiring job, and sanding is messy work which is not permitted in all boat yards. Professional help is a possibility for all or part of the repair job (such as sand blasting and mechanical stripping of the bottom), but the costs can add up quickly. A repair job for advanced osmotic blistering can be very expensive.

Before climbing up on deck, check the thru-hulls, paddle wheel for electronic instruments, and the propeller, propeller shaft and strut for any problems. The propeller shaft and supporting strut can be damaged during haulout if a lifting strap is accidentally placed under the shaft and it bears the weight of the boat as it comes out of the water.

The Deck, Mast, and Rigging.

When you climb up onto the boat, resist the temptation to go below deck right away. Instead, take some time to slowly walk around the deck. Keep an eye out for anything that looks wrong or out of place. Check for additional caulking or sealant that may have been applied around windows, stanchion bases, chainplates, and other deck fittings. Make a note to check these areas when you go below to see if, and how, water was getting into the boat.

One of your priorities when topside will be to determine if any water has found its way into the wood core of the fiberglass deck. (Most decks are stiffened with a wood core of end-grain balsa or plywood which is sandwiched between inner and outer layers of fiberglass.) More often than not, water will get in through holes used to hold deck fittings in place, and this is especially true of equipment that may have been poorly installed by one of the previous owners. Older boats may have slightly elevated moisture readings in a few areas of the deck, but if enough water does get in, it will eventually cause the wood to rot, and there will be additional damage when everything freezes during the winter. This will lead to delamination between the wood core and fiberglass skin, and will result in an area of the deck that may have lost much of its stiffness. Depending on how large an area is affected, and its location in relation to the cabin and other structures, repairing delamination and rotten core can be difficult and expensive.

When walking around on deck (and cabin top), use your weight to see if you can feel soft or mushy areas in the deck under your feet. A little spring in the deck is often normal on many boats, but you'll have a good idea

that something is wrong if the deck on one side of the boat feels a soft, while the corresponding area on the other side is nice and stiff. You can use the back end of a screw driver handle to tap any suspect areas of the deck. If the tapping produces a crisp sharp sound, it suggests that the deck is probably okay, while a dull thump sound indicates that some delamination may have taken place. It can sometimes be difficult to figure things out, and ultimately, the report on the condition of the deck may have to wait for an assessment by a competent surveyor.

Your walk around the deck will also give you the chance to verify the condition of the winches, stanchion bases, bow pulpit, stern rail, hatches, windows, running lights, and other fittings. The gelcoat and anti-skid areas of the deck should be given a close look. You may find some stress cracks which could be an indication of some sort of structural problem. However, on many boats the cracking and crazing in the deck gelcoat may only be superficial and cosmetic in nature, although the larger of these cracks will eventually have to be repaired before they develop into anything more serious. Such superficial cracking and crazing is often the result of a fiberglass deck that was built with a gelcoat that was a little too thick.

Don't forget to check out the cockpit, the area where you and your crew will probably spend more time than any other part of the boat. Look for cracks and verify the stiffness of the seats, cockpit locker covers, and cockpit sole (floor). Be sure to open those cockpit lockers to look around. They can sometimes be full of sail bags and other equipment, and you may have to empty them so that you can get your head into the lockers for a good view of nooks and crannies of a part of the boat that is often ignored. Also inspect any arrangements for storing the propane tanks. Such tanks should be in their own self-contained locker which vents overboard (above the waterline).

The mast and rigging should also be given a once over before going below. Depending on the off season practices of a particular club or marina, the mast may be left standing on the boat, it may be taken down and stored across the top of the boat from bow to stern, or it may be stored off the boat on a mast rack. Whatever the case, you'll want to check the stainless steel rigging wire for any broken strands (also known as meat-hooks because of what happens if you grab one with your bare hand). Equally important is the close inspection of swaged eye terminals at the ends of the rigging wire for signs of corrosion, minute cracks, or any evidence that the terminal fittings have been bent slightly out of shape. Any defects with wire or swaged terminals is an indication that some or all of the boat's stays and shrouds may have to be replaced.

If possible, check the top of the mast. Problems are less common with the swaged eye terminals at the upper end of the rigging wire, but the tangs to which they are connected should be verified. These tangs will either be bolted to the top of the mast or incorporated in the mast cap. Look for cracks in welds in the mast cap and any corrosion where a stainless steel bolt comes into contact with the aluminum mast. And while you are inspecting the top end of the mast, make sure that the halyard sheaves (pulleys) are rotating freely and that they do not have too much side to side play. It's also a good idea to take note of what accommodations have been made for a masthead wind indicator and VHF antenna.

The spreaders are another area worthy of some attention. The fittings which hold the spreaders in place are often attached to the aluminum mast with stainless steel bolts and screws. Again, it's a question of corrosion where two dissimilar metals come into contact. And finally, if a keel stepped aluminum mast is allowed to sit in bilge water, the bottom end will eventually show signs of corrosion. The same holds true if the lack of a drain hole allows water to collect inside the base of a deck stepped mast.

Inside the Cabin and Below Decks.

When you go below on a boat that has been laid up for the winter, you may discover that its main cabin and V-berth area are cluttered with all sorts of equipment that has been stored for the off season. It may be necessary to move all of this out into the cockpit in order to get a good look around.

Start your inspection of the interior by opening up the bilge and the lockers and compartments under the settees and V-berth. Now is time to revisit, from the inside, any suspicious areas that were identified during your examination of the exterior hull. Verify the condition of seacocks and thru-hull fittings along with the hoses and hose clamps. When examining the bilge, keep an eye out for any repairs or cracks in the floor boards (keel supports) which suggest the boat might have been involved in a severe grounding. Also, if there's evidence that standing water was allowed to sit in the bilge for long periods of time, look for signs of osmotic blistering in the fiberglass of this part of the interior of the boat.

By peering into the various lockers and compartments, you should be able to check the tabbing (strips of fiberglass material) which keeps the main bulkheads and other interior components firmly attached to the hull. If the tabbing has separated from the bulkhead or the hull, you may be on a poorly built boat or one which has been subject to some serious strain and twisting. Less critical are problems with the fiberglass tabbing for interior components such as the settees and V-berth structure. As long as the problem areas are easily accessible, repairing tabbing that has separated from interior components is relatively easy, although it can be a messy job.

If the boat has a deck stepped mast, verify that it is well supported by the main bulkhead and internal post, and that the downward force of the mast is properly distributed to the keel and over the lower part of the hull.

Also try opening and shutting any door in the bulkhead or nearby head (toilet). An out of alignment door could be a sign that pressure from the mast or something else is causing flexing in the shape of the hull and bulkhead. Note that a small degree of distortion in the shape of the hull may occur when a boat is sitting on land, but this often disappears when the boat is floating in its natural element. Moreover, it is not all that unusual to see doors that may be slightly out of alignment on many older structures, including boats.

At this point of your inspection of the interior, you may want to closely examine the windows and the entire length of the hull-deck joint for possible leaks by looking for barely noticeable water stains. It will also be time to see if any of those suspicious looking fittings you spotted on deck or the cabin structure are letting water into the boat. Because many boats are built with inner liners (fiberglass shells), the entry point for water on deck can be far removed from the spot where it actually emerges in the boat. And of course, when water does leak into a cabin, it always seems to drip from an area above one of the berths.

Be sure to inspect the chainplates during your search for possible leaks. Chainplates are often bolted on the main bulkhead, and they protrude through the deck to provide an attachment point for shrouds which hold the mast up. If the sealant around them fails, water will find its way down along the chainplates and onto the wooden bulkhead. If the bulkhead starts to rot, it can suddenly let go of the chainplates and the boat will lose its mast.

Although cabin cushions are not really a factor in determining seaworthiness, they have a major impact on a boat's livability. Take a good look at the cushions' covering material, and see if the zippers are still serviceable. The foam inside the cushions may also be finished, and this isn't obvious when you are hurriedly inspecting a boat. So take some time to judge the comfort of the cushions by sitting down on the settees or lying on the berths. Unfortunately, the various custom fitted cushions on a sailboat can be quite expensive to replace, but it's an investment that can do wonders to rejuvenate a run down interior.

Plumbing and the Electrical System.

The plumbing systems on larger boats can start to become quite complicated. Check the fresh water tank(s), hoses, hose clamps, and any hand, foot, or electric pump(s) in the system. You will probably find the tank(s) are due for a good cleaning, and that some hoses and hose clamps should be replaced.

Take a close look at the waste system if the boat is equipped with a separate holding tank and head (as opposed to the smaller system consisting of self-contained toilet/tank). Make sure the holding tank is vented outside, and that the line isn't blocked. Unless it is relatively new, you can assume that seals and joker valve in the head should be replaced (they sell kits for this). The same holds true for the large hose between the tank and the head. These jobs are not pleasant, but they help to ensure that boat does not develop any odor problems.

Determining if the 12 volt electrical system is adequate and in good working order can be relatively easy on an older boat. Unless it has been refurbished, you can assume that most of it should be replaced. Many boats built in the 1970s and early 1980s came with electrical systems that were barely adequate two decades ago. Today's boats are often loaded with all sorts of additional electric and electronic equipment, and they often require new wiring and upgraded fuse or breaker panels. Another problem is that previous owners may have piggybacked all sorts of extra equipment onto existing wiring and circuits on the electrical panel, and figuring out what's what may be next to impossible. Rewiring such a boat is a project which can take place over one or two seasons, and the survey report should point out any work that has to be done on an urgent bases.

In the meantime, you should check the system for potential short circuits by looking for frayed wiring, loose wires in lockers or compartments that easily become frayed, and electrical panels whose back is completely exposed to the interior of a locker. Also note that 18 gauge wire may be inadequate for runs over 15 feet (5 meters), especially when powering 12 volt equipment which draws a fair amount of current. Sixteen and even fourteen gauge wire is often the best choice for many applications onboard.

Mistreated batteries will not have much life left in them, but this may only become evident once you start using them and discover they no longer hold a charge. The use of a hydrometer can reveal if the voltage of any one cell is substantially lower than others, a sign that the battery should be replaced. Whatever the case, look for indications that the batteries have been well maintained. They should be relatively clean, each cell should have the correct fluid level, and their terminal post and clamps should be corrosion free. And needless to say, heavy batteries should be securely strapped into place.

The Sails and Engine.

Proper inspection of the sails and engine will require the services of a sailmaker and mechanic. In most cases, even professional surveyors will only give a cursory examination of these items in the course of their work.

Nevertheless, you may want to at least start the engine to verify that it works. This is easy to do if the boat is in the water, but if it is stored on land, it will be necessary to find a way of supplying water to the engine's

cooling system. Outboard motors can be started away from the boat with the help of a garden hose and flusher attachment (which looks like rubber ear muffs). If the hose is long enough, it is also possible to start an inboard engine on a boat that is stored on land. This assumes that the starting battery is onboard and that the engine is no longer winterized.

Generally speaking, and if the belts on an inboard engine appear to be old and worn out, if the engine compartment is dirty and does not look like it has been opened regularly, it is very likely that the motor has been poorly maintained and that it will give you trouble. If, by comparison, you find spare engine parts stored away on the boat (filters, impellers, etc.), an engine compartment that is relatively clean, and belts that are in good shape, it's likely the motor has been well looked after and is in good condition. Beyond this, you'll probably have to rely on a mechanic to learn more about the condition of the engine.

The sail inventory also deserves a quick once over. If you find any Mylar sails, assume they will have to be replaced sooner than later. A mistreated Mylar sail can be destroyed in one season, and even one that has been cared for with kid gloves will have a life expectancy that will be considerably shorter than its Dacron equivalent. But unless you are looking at boats that have been raced a lot, you'll probably come across Dacron (polyester) sails most of the time. With a six month sailing season in central Canada, twenty year old Dacron sails that have been well maintained and not subjected to abnormally heavy use, can still have some life left in them for casual day sailing and short cruises (although it will be on its last legs). Also note that even if an older sail is holding together reasonably well, it can no longer be expected to have an optimal aerodynamic shape.

As a general rule, the more a sail feels crisp and stiff, the more life it has left in it. Conversely, the more a sail feels soft and limp, the sooner it should be replaced. If there's enough open space nearby, you may want to unfold the mainsail and genoa for a closer inspection. Keep an eye out for any damage or signs of repair, and be sure to check the stitching. On the mainsail, pay attention to the area around the batten pockets and the slugs which slide up the mast track. With the genoa, double check the area about half way up the leech that sometimes rubs against the spreaders. Many older sails can use some restitching and minor repairs, and this is usually not too expensive.

What next?

Your inspection will help you determine if the condition of the boat justifies the seller's asking price, and whether or not you want to move on to the next step in the purchasing process. This should involve making an "offer to purchase" which is conditional on you being satisfied with the condition of the boat as described in a surveyor's report. If your offer is accepted, the boat will be conditionally sold, and you'll be in a position to engage the services of a professional surveyor to produce the necessary report.

After conducting their own inspection of a boat, some people may be tempted to ask if it is really necessary to spend the \$250 to \$400 it typically costs for a professional survey, especially when they do not yet own. The answer to this question is a definite yes, and this is particularly true for any boat 20 feet in length and over.

There are many reasons for using a surveyor, but first and foremost is that it takes knowledge and skill to properly assess the condition of used boats and to interpret the extent of any problem that may be discovered. For example, the prospective buyer may correctly identify an area of the deck that has a rotting core and delamination problems, and as a result, may decide that the boat is no longer worth considering. However, a professional surveyor may report that the core problem is limited to a small area, that it is relatively easy or inexpensive to repair, that rest of the deck is sound, and that boat otherwise surveys very well. Conversely, the prospective buyer may inspect a boat and be convinced that it is in near perfect condition only to learn from a surveyor that the boat was involved in a severe grounding and has suffered extensive hidden damage in the keel support structure.

Another reason for using a professional surveyor is that most insurance companies will require a recent survey before they issue a marine policy on a boat that is over 10 years old (and will probably require a new survey every ten years thereafter). If you are going to pay for a survey in order to insure the boat, you might as well get it done before closing the deal, and that way you'll have the benefit of knowing exactly what you are buying.

Furthermore, a surveyor is in an excellent position to explain exactly how the boat stacks up to others on the used market. Such information will be rooted in reality rather than a textbook notion of used boats, and it will almost certainly be worth more than what you'll get from your know-it-all brother-in-law, the gang at the club, or even websites such as this one. It is also likely that a surveyor will be able to give you a ball-park estimate of the cost of correcting any problems with the boat, and, if you're thinking of doing the work yourself, an idea of the skills and number of hours that may be required to complete the job.

Finding a Competent Surveyor.

Many of the advantages of having a boat surveyed will only materialize if you are able to find a competent surveyor. Unfortunately, this may not be as easy as it seems because anyone can call themselves a marine

surveyor in Canada and the US. Although it appears that the federal government may be starting to look into the need for an organization and standards for surveyors, there is still no official certifying body which sets minimum qualifications for people involved in this business in Canada. A couple of organizations which operate mainly out of the United States perform some of these functions, but membership in these bodies is entirely voluntarily.

The author of this website has had a commissioned a number of surveys over the years, and can attest to the fact that some so-called surveyors simply produce a nicely detailed description of the boat and equipment while overlooking some fairly obvious defects. Nowadays, many of these surveyors are also quick to pull out their moisture meters, but, here again, it takes skill and experience to obtain meaningful readings and to properly interpret them.

So how does one find a good surveyor? Ask around. Look for an independent surveyor who has been around for a number of years, and is in the business more or less on a full time basis. Avoid people involved in brokerage or the repair businesses, and who may only be doing surveys as a sideline. You may enquire around marinas and clubs about surveyors who have a reputation for being thorough, and even harsh, on the boats they examine. Since they have a vested interest in making sure that boats are well surveyed, insurance companies may be able to come up with names of some good people (but you can't always count on it). Membership in one of the American-based surveyors' organizations is probably a good indicator of competency. [\[links to more info \]](#)

Don't be afraid to phone several surveyors and ask about their qualifications and experience. Although they can be very busy from the beginning of April to the end of June, if you phone during the off season, most reputable surveyors will be happy to talk to you about how they go about their work, and some may even share their views on certain boats on the used market. When shopping around for a surveyor, try to find someone who has experience with the model of boat you are considering. Even a good surveyor will do a better job if they are already familiar with how a particular model was manufactured and its history for potential problems. And finally, if the boat you are looking at is outside the travel range of someone you know is a good surveyor, ask for a referral.

Since there are no official standards or governing organizations for surveyors, their prices can vary considerably. Someone without much experience may only charge \$100 for a so-called "insurance survey", which, by definition, is not very thorough. However, the cost of a real "pre-purchase survey" for a production fiberglass sailboat usually runs around \$10 to \$12 a foot, possibly a bit more for larger boats with a number of complex systems (as of 2001). There can also be extra charges for the surveyor's time and expenses for travelling to the boat, although many will waive this fee if the job is located in an area close to their home base.

Most surveyors will give you a verbal summary of the condition of the boat shortly after completing the survey, and will provide a detailed written report within a few days. Don't be surprised if you are handed a report which lists several dozen items requiring attention. (Good surveyors are even capable of finding a surprising number of shortcomings on a brand new boat.) Many surveyors will issue their report in terms of items requiring immediate attention, matters that should be taken care of in the next year or two, and projects that can be carried out at some point in the future at the owner's discretion.

Although the items requiring immediate attention are obviously the important ones to look after, they often involve problems that are relatively easy to correct. For example, it is not unusual for a surveyor to recommend that the hoses and hose clamps on seacocks and thru hulls be replaced as soon as possible. If, on the other hand, the report does identify a major defect or problem which had not already factored into price of the boat, you may want to renegotiate your offer or see if the seller is willing to make the necessary repairs. Whatever the case, you should seek the guidance of the surveyor in determining the extend to which such a defect or problem should influence your decision on whether or not to purchase the boat.

Good luck, and happy sailboat inspecting.

by Michael McGoldrick, 2001.

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