Recreational boat inspection in New Zealand demystified

By Paul Stock ©2018

Buying a boat is a big decision made harder by the fact that boats are usually expensive, depreciate in value, and cost money to keep. The redeeming aspect is that a boat is a vehicle to give you pleasure, an investment in happiness. How do you put a price on that? If the boat turns out to be a bit (or a lot) of a lemon this can rapidly turn in to a nightmare. Beneath the surface of seemingly great boats can lurk a myriad of structural and mechanical faults. And vice versa.

The below is a collection of information about boats and surveys to help you end up with a good boat in a confusing sea of classifieds.

Survey vs. inspection

There are four specific kinds of surveys or inspections

1. Commercial vessel survey
2. Recreational vessel inspection (pre purchase inspection)
3. Vessel risk evaluation (for insurance purposes)
4. Damage surveys (for insurance/repair purposes)

Commercial boat surveys are done by formally tested and accredited surveyors with limits placed on accreditation relevant to experience and qualification. Specific initial and periodic surveys on vessels are made to verify their safety for operation.

Recreational vessel pre purchase surveys are an inspection. The term "survey" is carried over from the commercial area and used interchangeably by brokers, some inspectors and purchasers to mean "pre purchase inspection". The report content will vary between inspectors. There is no formally required qualification to conduct these inspections, but they are usually done by experienced boatbuilders. Recreational Inspectors are not required to be certified and there is no New Zealand certification requirement (unlike commercial boat surveyors). Some inspectors are members of Naval Architecture or Surveying organisations and it is relatively straightforward to become a member of such organisations.

Role of the Inspector

Pre purchase survey

The role is generally:

- To find the defects and issues with the boat so that the purchaser can know what they are buying
- Document the findings of the inspection and provide a list of issues so the buyer and seller can negotiate any price adjustment or other solutions for defects found during the inspection
- To help guide the buyer on technical aspects of the boats condition – acting on the buyers behalf and services paid for by the client. The buyer may often accompany the inspector during the inspection so that any issues found can be explained.

The pre purchase inspection is greater in scope than an insurance evaluation so most insurance companies will accept a pre purchase survey for insurance evaluation purposes.

Inspectors generally use their own template which varies between inspectors. Survey report length and scope can vary significantly between inspections. Wainui Marine uses digital photos to illustrate defects found and we keep a portfolio of photos for each pre purchase job.

Insurance inspection (Vessel risk evaluation)

The role is generally to enable insurers to evaluate risk associated with insuring vessels. Older vessels (usually over 20 years) generally require an evaluation report and periodic evaluation inspections from then on. Some insurers have their own templates.

The scope of an insurance inspection is generally less than a pre purchase and may sometimes be able to be conducted afloat. The inspector may not tap the whole vessel for example, however risk factors such as system installations such as gas, electric, through hull fittings and glands will be inspected that could lead to an insurance liability.

Damage surveys

In the event of a vessel having an accident such a grounding, fire, collision, fall off a trailer, capsize, dismasting, loss of a rudder or any other damage that requires repair, an inspection will be required to determine the extent of the damage and the scope of repair so that the work can be costed on behalf of the underwriter and insurance claims settled.

Age

New Zealand has an aging fleet of recreational boats. As with most things, boats deteriorate more with age and depreciate in value. Unfortunately there aren't many classics that increase in value. As vessels age they require more maintenance and refits. However there are some vessels that have been continuously maintained and upgraded that can be as good as new decades after construction. Some types of vessel lend themselves to long life more than others, for example modern production vessels are manufactured in such a way that their structures and systems are difficult to access they are less practical to upgrade and fix than some of the boats built before mass production.

Materials

Vessels are constructed from many combinations of materials. No one material is better than another, it depends on the application. Some combinations of materials are not ideal, such as metals that are "dissimilar" with one being more noble than the other. In such cases the less noble metal when in contact with an electrolyte like salt water, will fizz away. Examples of passive/noble/cathodic metals are gold, high grade stainless steel or copper. Examples of active/anodic metals are aluminium and zinc. That is why zinc is commonly used as a sacrificial metal (anode) on shafts and engines.

Not all noble metals are as good as they seem though. Stainless steel, for all its attributes of corrosion resistance is subject to crevice corrosion or pitting which can cause bolts to shear off in the "crevices" of the threads and for pits to form where salt water can lie, such as pits on hydraulic shafts leading to seal leaks and deterioration of drive shafts.

Some other materials that seem great at the time have not stood the test of time, such as balsa core in applications where water can leak into the core such as from deck fittings; or orthothalic polyester resin, used on early fibreglass boats which turned out not to be very water resistant and led to osmosis issues, and many other examples too numerous to list here.

Timber

Timber is used in so many different construction methods in boats that we have to divide it's use up according to construction type. Timber species are suitable for different applications depending on part of the vessel and timber density or properties. In every case the timber should be at least somewhat durable unless completely encapsulated in resin or fibreglass, which is not foolproof; any breach in the encapsulation that allows moisture to enter can lead to quick deterioration (rot). In such cases it is very difficult to dry the timber out. Availability and cost is also an issue.

The two main groupings of timber vessels are:

<u>Traditional Construction</u>

Most traditionally built boats in New Zealand are now either referred to as Classics or they are fishing boats. These are usually planked either;

- lengthwise planks edge joined (carvel construction) with our without caulking between seams,
- lengthwise overlapping like house weatherboards (clinker or lapstake construction)
- diagonal layers with a smooth outer finish (diagonal) – sometimes with felt between the layers
- a combination of lengthwise and diagonal construction

All of the above examples are generally supported by a framework of planked or plywood bulkheads, ribs, floors, frames and maybe stringers (often a heavy bilge stringers). The deck is made of heavy lengthwise members and deck beams with planked timber over and sometimes canvas and paint applied for waterproofing.

The above methods are "mechanically fastened" and rely on nails, rivets and screw fastenings. The vessel moves and works against the fastenings meaning that they deteriorate according to the use duty and abuse they have suffered. Refits are expensive and combining old and new construction methods often fails as the old is a fluid moving system, whereas the new glued methods are rigid. Attempts to glass over traditional structures need to be very heavy and substantial so as to provide adequate strength to prevent cracking. Modern rigid paints do not work as they do not flex.

Issues common with planked vessels include:

- Rot – particularly where there is freshwater intrusion, a lack of ventilation and where timbers are not very durable or where sap wood may have been used.
- Broken frames and planking movement – due to stretched fastenings and overall aging
- Fastening sickness around fastenings – a current flow caused by the saturated wet planks around fastenings causes the timber to crumble and lead to fastenings becoming less secure leading to more movement, more broken fastenings etc.
- Worm – Toredo (big holes) and Gribble (small holes). This will happen anywhere wood is exposed without adequate antifouling or sheathing and is why copper bottom sheathing was often used on traditional boats

Because of the cost of labour and the time intensive nature of effecting repairs on older vessels they often get to the stage where it is not practical to save them and they are no longer safe to use.

One method of saving tired timber planked vessels that can be successful is to fully dry them and then glue a moulded diagonal exterior skin on the exterior of the vessel, followed by glass sheathing as would be done on a modern glued vessel.

Glued timber construction

Glued timber construction is very different to the above as the structure does no rely on "pins" to hold it together and the glued timber vessel is like a consolidated unit. Even better, the grain of the timber can be engineered so that the strength attributes are considered in the calculations. Glued timber is usually combined with or sheathed in fibreglass reinforced epoxy and can be very durable and long lasting without many of the problems found in traditional timber. The common types are:

- Glued diagonal construction (moulded). This method was used extensively in the 70's and 80's and tended to be based on a glued framework that was influenced by traditional wooden boatbuilding. There was an internal keel, laminated frames, spaced quite far apart, plywood bulkheads, and closely spaced stringers. The hulls of boats under approx. 12m were usually 2 skins and over 12m 3 or more skins. The decks were plywood constructed on a framework similar to traditional craft but glued and with wider spaced beams and the hull and deck were glassed over with light epoxy sheathing. Teak caulked decking of approx. 10mm thickness was often overlayed over the ply deck. Boats built this way tend to give very good service if well maintained although teak decks require replacement and ply decks are susceptible to rot via fresh water leaks around deck fittings and stanchions and hatch openings.
- Cedar strip planked construction, glassed both sides. This method became popular during the 1980s and was much quicker than diagonal moulded construction. Cedar is very light and durable and even boats that have got some water in the planking continue to give good service. Early boats were constructed on a framework similar to the diagonal boats, a heavy kelson and longitudinal framework. Over time the method evolved to become engineered structures (late 80s and 90s) so the heavy kelson disappeared, the skins became heavier and internal framework progressively reduced as the overall strength became more integrated in the ***monocoque*** shell structures like foam core composite; except using strips of cedar instead of closed cell foam. New Zealand companies like High Modulus, Adhesive Technologies, and Wayne Smith pioneered the move to engineered structures often utilising the strip planked epoxy glued cedar as a core. Decks were usually plywood and had/have the same issues as diagonal moulded boats.
- Plywood construction was common in the 60s and 70s and is still used for some launches and for bulkheads, decks and repairs. It is a fantastic material except for one small problem; it rots relatively easily. Fresh water and a lack of ventilation is the catalyst for rot. Marine plywood (BS 1088) is not really durable, despite its low void and good gluing specification, as the timber that is used in the veneers is not treated. Over the years as plywood boats age, the rot problem gets harder and harder to avoid.
- Combinations of the above

Check back soon for more coming on:

composite/fibreglass/steel/aluminium/osmosis/engines/hauling out and insurance/rot/electrical and electronics/maintenance/depreciation and production vs. custom boats.