

# John Lilley & Associates

## Marine Surveyors

### Timber Specialist

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Use this checklist to do your own close inspection of your vessel. It will help you prepare your boat for a future survey, and may be very useful in guiding you in the purchase of a future boat. This may not make you a surveyor, but it could save ££££s in survey fees for the wrong boat in the future!

This is a checklist designed to help an interested owner carry out their own periodic inspection of the vessel. It is not designed to replace a professional survey but may well help guide an owner to those parts of the vessel which often become overlooked in the course of ownership. It may also be of limited value when carrying out an inspection of a possible purchase boat prior to commissioning a professional survey

A brief description of some of the structural terms that may be used in this inspection to avoid confusion:

**Carvel build:** wide timber planks laid edge to edge on frames and riveted or nailed or screwed to the frame. The slight external gap is caulked to keep watertight. Not often used in amateur build as it requires more equipment and cannot usually be completed single handed. Possibly the highest retained value for timber construction.

**Strip build:** narrow planks edge nailed and glued together screwed to wide spaced frames. Used by many amateur builders and one or two professional builders. Less expensive to construct. Relies for longevity on glue quality and proficiency of build. If built well, a very strong hull, if built poorly often a poor investment.

**Double diagonal:** older method for building chine craft. Wide thin planks laid at about 45 degrees from vertical with another skin laid at the opposite angle. Calico membrane between skins for proofing. All skins riveted together at each intersection point. A vast number of fastenings used. Occasionally triple diagonal has been used.

**Hot moulded:** wide thin laminates are laid over a mould with several skins in alternating directions and glue between all skins. The mould is "vacuum" packed and oven baked. A very strong durable hull.

**Epoxy saturation:** similar to above but the skins are stapled together prior to total epoxy resin saturation of all timber including edges to build up to the required thickness. The resin prevent further water loss or absorption and in theory should not shrink or expand so long as the epoxy coating is not breached.

**Cold moulded:** a cross between the above hot moulded and epoxy. The glue is a standard conventional cold set glue. Only as strong and as long lived as the quality of the glue used and the proficiency of build.

Frames: bent or sawn to shape vertical members that the planks are attached to.

Sheerplank: the first plank from the deck.

Garboard: the first plank from the keel.

Shelf, Shelves: longitudinal timbers used for supporting structure such as deck beams i.e. deck shelf

Carlin: longitudinal timber used for attaching coachroof to deck.

Centreline structure: the heavy timber units that run fore & aft in the middle of the vessel. (backbone)

Clamp: longitudinal member fastened to the coachroof sides at top to support deckhead.

Stringers: longitudinal members to add support to bilge areas.

Floors: shaped members fitting across keel and up two or three planks internally to keep shape.

Apron: shaped member connecting forward section of keel to stem.

Breasthook: shaped member in bow close to deck internally to tie deck shelves and stem together.

Deadwoods: large blocks of timber used as fillers aft of the keel in the prop shaft area externally.

Backbone: the central timber structure from stem to stern.

Keel/keelson: generally the substantial timber member that runs along the centre of the vessel where the garboard plank is attached to as well as the ballast keel where fitted.

Knees: These are shaped pieces of wood (occasionally bronze) that connect and support two sections of timber when they meet at any angle other than straight line connections, where they are butted together square ended with a block spanning both ends and fastened to both end of the timber being connected. Straight connections can also be scarfed together which creates a tidier and stronger connection.

Quarter knees: usually fitted at the internal top of the transom port & starboard internally to connect the beam shelf to the transom.

Hanging knees: knees that are fitted vertically.

Lodging knees: knees that are fitted horizontally to locate transverse beams etc.

Fastenings: a timber vessel has a multitude of fastenings, some of these hold the planking to the keel and frames, others are bolts that hold sections of the timber centreline structure together, commonly seen as scarf bolts. Other bolts/rivets hold knees in position etc. Fastenings can be steel bolts, bronze bolts, screws of all types, copper rivets, blind dumps (bolts without threads hammered home)

Electrolytic decay: This is damage caused to timber by chemicals that are produced when adjacent metal fittings or fastenings decay, either through natural corrosion or more commonly through electrical action between metals immersed in water. This damage can vary in severity to merely causing screws not to hold and having to increase size and length, to wholesale destruction of large timber sections such as deadwoods where stern tubes pass through.

Keel Stepped Mast: where a mast passes through the deck and stands on the keel. Usually incorporating a separate mast step block which is attached to the structure. This is designed to spread the load and prevent distortion to the bilges in this area. The mast usually has a tongue that locates in a mortice slot.

Mast partners: in the area of the mast any vessel needs extra supports to prevent distortion of the hull/deck/coachroof when hard sailing. Parts of this reinforcement is known as the mast partners.

### **Timber used in boat construction.**

A brief list of timber types that can be used for additions/repairs.

**Afrormosia** : dark brown, heavy. Joinery and varnished railings etc.

**Ash** : used for tillers, spreaders. Light and strong but not durable.

**Douglas fir**: also known as columbian pine. Varnished spars, stringers, beam shelves occasionally deck beams.

**Elm** : used underwater, commonly for rudder blades and keel sections. Not durable above water.

**Idigbo** : underrated hardwood, light, easy to work various uses including planking. Uninteresting finish for varnish. Not spars.

**Iroko** : universally used for most structural parts including planking and keels. Not for spars.

**Larch** : used for planking, stringers, beam shelves. Fairly durable. Not usual for spars.

**Pine** : general purpose timber for non external use. I.e. cupboard shelving, joinery framing. Various qualities available. Slow grown is stronger, heavier and more robust for boat work.

**Mahogany** : many species wrongly called mahogany, African mahogany (Khaya) used for planking and varnished joinery. Brazilian mahogany more easily available. Also ok for similar uses although heavier. Check type before using. Some "mahogany" is totally unsuitable for inclusion in structure of boats.

**Oak** : various origins, but accepted as the best for bent frames, grown knees and many other uses including rudder blades, deck beams, keel sections etc. Ferrous fastenings corrode when fitted in oak.

**Sapele** : similar to mahogany, can be used in place of in joinery.

**Spruce** : clear spruce (knot free) is used for the best varnished spars. Not durable.

**Teak** : very expensive, but suitable for virtually any use except spars. Can be troublesome gluing because of the inherent oil.

**Utile** : similar uses to mahogany, makes good attractive joinery.

Many timbers have a use in boat construction and repair, if in doubt make enquiries before using in critical areas such as planking and structural situations. Any timber can be used for joinery according to personal taste.

### **HULL EXTERIOR.**

#### **description**

#### **hull planking above waterline**

Check for type. I.e. carvel or strip plank. On strip plank check for edge gaps that may be a result of glue failure, using square edge strips or poor build attention. Check for movement at hood ends. If the vessel is sheathed attempt to locate areas of failing bonding of sheathing. Sheathing can prevent discovery of many major deficiencies, both above and below the waterline. Any sign of external movement or fault can require large scale removal of sheathing to inspect. Most owners would not allow this and this is frequently an area where a surveyor has to be vague.

#### **stem**

Solid or laminated, check for laminate failure and decay close to top where water ingress can cause deterioration.

#### **stemhead fitting**

Check for movement.

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