Surface Preparation – Wood

Summary

Wood is the only naturally boat building material in use today. Perhaps this is why wood is so aesthetically pleasing and it is certainly why wooden trim, rails in particular, is so widely used on superyachts. As wood species vary immensely it is not intended to go into any detail here. If in doubt you are advised to consult your International Technical Representative for advice on surface preparation. However, the following are basic pointers for those approaching this for the first time.

All boat-building materials have advantages and disadvantages and wood is no exception. Firstly wood can rot although in boat construction only those timbers with the highest levels of rot resistance are used. These are timbers of high natural oil content; Afrormosia, Burmese teak and Utile being common amongst the many species used. Secondly timber expands and contracts as it absorbs moisture and dries out and therefore its movement is often much greater than that experienced with other construction materials.

Using modern paint technology it is possible to place an almost impermeable membrane over a wooden hull. Wood/epoxy composites are a typical example of this. But remember … older boats, often undergoing major re-fits, need to absorb a small amount of moisture to swell the planking and keep the seams tight. So the type of construction governs the type of paint system. Traditionally constructed classic boats use combinations of hard and soft (softer) timbers. Various species have qualities that necessitate different paints. If you have any doubts about the type of paint required for the constructional type of vessel you are maintaining consult your International Paint Technical Representative.

- Old bare wood should be checked for wet rot, gribble or teredo worm, signs of reaction with metals, cracking, or flexing allowing water penetration.

  Wet rot usually occurs if the moisture content of the timber exceeds 30% and is attacked by microscopic fungi. Any exposed timber will be seen as dark in colour and whilst still wet is compressible and friable when dry. Salt water tends to retard wet rot but as many vessels moor in harbours prone to fresh water layering, so the risk is a realistic one.

  Gribble is a crustacean about 3 mm long. It lives in salt water and bores into timber eventually reducing it to a crumbling mass. However, it is incapable of boring through well-painted surfaces. The same can be said of the teredo worm. The tiny worm enters the timber through damage to the paintwork and eats its way progressively along the grain. Sound paintwork prevents this.

- Splits and cracks in timber need careful examination to establish the true cause and effect before painting.

The foregoing is a basic guide for inspecting wooden vessels in service and we now reach the point where preparation needs to be considered.

- It may prove necessary to remove old coatings, a common method being to burn it off. This is a very effective method but there are points to be aware of and care to be taken. Burning off should be carried out in open air or well-ventilated conditions. Whilst modern gas torches are more controllable than the traditional blow torch, areas to be varnished need careful attention to prevent unsightly scorching of the timber.

  Beware of burned off material falling to the ground and continuing to burn. Keep the area below clear of combustible materials. **Do not burn off or dry sand antifouling** since the dust and degradation product are at least irritating and at worst toxic.

  Consult the manufacturers safety data sheets before attempting to burn off paint. More modern methods of paint removal on timber include bead blasting with microscopic beads at low pressure. Hydro-blasting has also been used.

- All bare wood should be sanded down either by hand or mechanical methods. Always sand along the grain to remove remnants of old paint out of the grain. Sanding across the grain causes scratches, which even in new construction will show as unsightly marks particularly when varnishing. All traces of sanding dust must be removed as this will impair adhesion and produce a bitty finish. With oily woods such as teak, swab the surface with International Degreaser (ITA080) and wipe down with lint free cloths, followed by sanding. This removes the residual oil which otherwise would impair subsequent paint or varnish adhesion.

Grade of paper	Normal use
P80 -120	When used for sanding timber it should be used in the direction of the grain to remove remnants of old paint that has been burnt off or stripped with paint stripper. Will leave timber in a scratched condition. Widely used for sanding heavy-duty fillers and heavy build-up of old paint schemes.
P180 - 220	Often used on new wood or timber that has been burned off. Would not advise using on timber, which is to be varnished, as it is too coarse. Widely used for sanding dressing fillers and fine surfacing compounds, high build primers etc.
P240	One of the most widely used rubbing down papers. Final sanding of primers is not uncommon nor is the rubbing down of old enamel prior to re-coating with either basecoat or finishes.
P280 - 320	Used for sanding timber prior to varnishing and rubbing down freshly applied undercoat prior to application of enamel.
P320	Rubbing down, basecoats, varnishes and enamels
P400	For rubbing down freshly applied enamel
P400,500 or 600	Mainly used for taking out blemishes in paint films prior to the application of final coat or glaze coat.
P800 upwards	Mainly used for burnishing and polishing.

Painting and Varnishing Timber

Varnished wood brings charm and character to any boat. Unfortunately it can also bring problems and extra work if it is to enhance the appearance of the vessel. Wood has to contend with sun and sea and often with harsh chemicals such as teak deck treatments that can run or be splashed over its surface. Flaking varnish, blackened or discoloured woods are problems we have all seen but careful preparation and good application practices can over come this, particularly with today's sophisticated paints and varnishes.

- For varnishing, once all dust is removed, apply the first coat of varnish usually thinned by 25%, (check the appropriate specification in this manual) which will seal the timber before further varnishing. In certain types of timber multiple thinned coats of varnish may be required before full coats can be applied.

- For painted surfaces the same principle applies. Thinned coats of initial primer will aid penetration of the timber and subsequent adhesion of the scheme. Paint specifications are written for guidance and it may be when painting certain types of timber that extra coats of primer are required for those of a more porous nature.

- Certain timbers, those of a less oily nature, may need a timber preservative before priming. If in doubt consult your International Technical Representative.

- When wet sanding primer take care not to abrade through to bare timber. Wet sanding should only take place when an adequate thickness of primer is on the surface.

Boat Building Timbers - Some Typical Characteristics

Species	Hard/ Soft	Main Country of Origin	Colour	Density per cubic foot	Rot resistance	Characteristics
Larch	Soft	Europe	Yellow/ Brown	20 - 23	Good	Tough, durable but resinous. Excellent for planking. Not difficult to paint.
Parana Pine	Soft	South America	Cream/ Brown	14-16	Poor	Tough even texture but easily warps. Absorbent when painting usually needs a timber preservative – Intertox.
Pitch Pine	Soft	Honduras	Red/ Brown	22-24	Good	Resinous, flammable but very durable. Excellent for planking. Sometimes difficult to wet out when applying primers, must thin first coats to assist timber penetration.
Red Baltic Pine	Soft	Russia/UK/ Scandinavia	Yellow/ Red Brown	11-12	Good	Prone to shrink. Knots liable to dry and drop out. Darkens with age. No good for varnishing due to natural discoloration of timber. Primes easily.
Spruce	Soft	Europe	Yellow /Brown	20-22	Good	Durable, tough but resinous. Mainly used for masts and spars and occasionally for small clinker craft. Easy to prime or varnish.
Western Red Cedar	Soft	Canada	Yellow tan	10-11	Very good	Very straight grained. Easy to paint and varnish. Tendency to be absorbent.
Afrormosia	Hard	Africa	Brown	18-24	Very good	Hard, close-grained often used as a substitute for teak particularly for decks and superstructures. Paint and varnish as for teak.
Ash	Hard	Japan Europe	White cream	15-16	Good	Straight grain mainly used for frames. Take care wetting out with primer.
Mahogany	Hard	Sth America Africa	Reddish Brown	14-15	Good	Varying species widely used for fitting interiors, planking, bulkheads etc. Can be painted and varnished without difficulty.
Oak	Hard	UK/USA Japan	Yellow Lt.Brown	20-23	Good	Mainly used for frames and fittings. Very acid timber discolours steel fittings. Difficult to wet out with paints and varnishes. Initial coats may appear to be cissing.(fish eyes)
Obeche	Hard	Africa	Light Yellow	9-11	Poor	Used in cheap cabin furnishings. Difficult to paint or varnish absorbs unevenly.
Ramin	Hard	Malaysia	Straw	18-19	Good	Tendency to split. Not difficult to paint or varnish.

Species	Hard/ Soft	Main Country of Origin	Colour	Density per cubic foot	Rot resistance	Characteristics
Teak	Hard	India Burma	Brown	20-24	Very good	Extremely durable and stable. Difficult to paint and varnish may need special products. Can be used for almost any part of yacht construction.
Utile	Hard	Central Africa	Reddish Brown	15-18	Very good	Veneers and marine ply are major uses and cabin furniture. Not difficult to paint or varnish.
Iroko	Hard	Africa	Brown	20-24	Very good	Not related to teak but almost as good. Used as for teak but not so attractive when varnished.

Miscellaneous Points

- An average 'dry' piece of timber in Northern Europe contains about 10 -12% moisture, whilst kiln dried can be as low as 5%. Any excessive variation from this will cause problems. Excessive moisture in timber can weaken glue; corrode metal fastenings and cause warping.

- **Reaction with metals.** Acid in timber can affect metal fastenings particularly in the older vessel. A typical example would be mahogany on oak with steel/iron fastenings if the insulation has become damaged. This will be seen as blue/black staining.

- Remember also that if treating plywood surfaces, particularly those panels that have been bent to a curve, the outer veneer will be stretched, which may later result in tension cracking that will break the paint film and allow water ingress. Check carefully before painting.