Varnish over Epoxy

The appeal of well-maintained, varnished wood trim on boats is hard to deny. It evokes our past and we respect the owner because of all the time and effort it takes to apply and maintain the varnish.

Historically "the look" was achieved by applying twelve or more coats of spar varnish. This required a period of weeks because only one coat of varnish could be applied per day. Each coat had to be sanded before the next coat could be applied. Applying more than one coat per day caused the varnish to dry slowly, and in some cases to alligator and wrinkle.

Varnish manufacturers now formulate products that speed up the process by allowing recoating the same day. While this reduces the total days required, applying all the layers still takes a great deal of time.

Battling the forces of nature

When varnish is used alone as a coating, it is constantly fighting two distinct battles. One is to stay attached to the substrate that is expanding and shrinking as the moisture content of the wood changes. Seasonal changes in moisture content occur because varnish is not a particularly effective moisture barrier. When the wood changes dimensions, it forces the varnish to stretch and shrink in order to stay attached. Given enough stretch/shrink cycles, the coating will eventually crack.

The other battle is the oxidation from exposure to the sun's UV light, a phenomenon that contributes to loss of gloss and cracking.

Good varnishes are designed to address both stretch/shrink cycles and UV degradation, but eventually the two forces in combination will break down varnish and cause it to fail.

The benefits of epoxy

Another method to achieve "the look" is gaining popularity and cuts labour time. Professional yacht refinishers now use WEST SYSTEM® 105 Resin / 207 Special Coating Hardener as a clear base over wood trim before applying coats of varnish.

Three coats of epoxy followed by three coats of varnish can achieve the same depth and look of twelve or more coats of varnish. Because there are no solvents evaporating away from the epoxy, it builds thickness faster per layer than varnish and it doesn't shrink when it cures. In addition, three or more coats of 105/207 can be applied per day.

More importantly, sealing wood with an epoxy moisture barrier dramatically lessens its stretching and shrinking. Varnish benefits from being applied over a stable substrate. High-quality marine varnish is formulated with UV filters, so the epoxy coating benefits by getting the protection from UV radiation that it needs.

Epoxy with two-part polyurethane

Two-part clear polyurethanes are known for superior UV resistance and scratch resistance compared to traditional varnishes, but they have shown mixed results when applied directly to wood. They also tend to develop cracks due to expansion/contraction of the wood. Two or three coats of epoxy also provide a stable base for clear two-part polyurethane finishes. Applied over epoxy, they perform beautifully together and outlast either coating used by itself.

Coating new trim and removing/ refinishing existing trim

In new construction or when existing trim is removed for refinishing, we recommend that you encapsulate the piece with two to three coats of epoxy on all sides prior to installation and prior to applying varnish. (Three coats on surfaces that will be sanded). This seals the wood, effectively protecting it from water. You can install the trim with commonly used bedding compounds, or glue it in place with epoxy.

To eliminate places where water can get in, coat all drilled installation and hardware attachment holes with epoxy prior to running the screws in.

Refinishing existing trim without removal

Many people refinish their wood trim in place by stripping the old finish, sanding and applying two to three coats of epoxy, then applying varnish. For this method to work, it is important that the bedding compound beneath the trim is in good condition so water does not find its way into the wood behind the coating.

On fibreglass boats with wood trim, an in-situ method that works well is to undercut the wood trim all around the perimeter by 6.5mm and glue the edges down with epoxy to eliminate places where water can get in. The undercut area should be free of all bedding materials, leaving the wood and gelcoat clean and abraded. Strip the trim of all old finishes and dry it well before coating the undercut area with unthickened epoxy. Then fill with epoxy that has been thickened with 403 Microfibre Blend and coloured with wood sanding dust. Apply two or three coats of epoxy and then finish the trim with a minimum of three coats of varnish.

Keep the moisture out: sealing screws with epoxy

It is important to eliminate places where moisture can find its way into the wood. This includes applying epoxy to screw holes prior to running the screw in place. If you will need to remove the screw in the future, you can apply a wax or mold release to the screws. If you forget to apply mold release to the fasteners, you can use a soldering iron to heat the fastener head for removal.

Gougeon Brothers recommend sealing holes with epoxy because varnish typically breaks down first near hardware. This occurs because moisture finds its way in through screw holes as a result of thermal cycling. Sunlight warms the wood, causing air in the wood to expand and create pressure. The air escapes through poorly sealed screw holes and unsealed end grain. As the wood cools due to declining evening temperatures or daytime rains, the air inside the wood shrinks, creating a negative pressure which draws air and moisture in from the same places it escaped. Moisture from dew and rain is drawn into the wood as the pressure equalises inside the wood. Once inside, it is trapped and causes the wood to swell and discolour, which eventually causes the varnish to lift and peel from the wood.

This is why it is so important to seal the screw holes with mixed epoxy before installing the screws. Simply apply a few drops of mixed epoxy to the pilot holes or use a pipe cleaner to quickly swab the screw hole with epoxy before running in the screws. This will stop air from escaping and prevent water from getting in.

Steps to refinishing existing trim

1. Remove trim piece and clean all bedding compound and contaminants from the wood. Allow to dry thoroughly.
2. Sand the piece to remove stained and weathered wood.
3. Apply three coats of WEST SYSTEM® 105 Resin/ 207 Special Coating Hardener. Second and third coats can be applied while the previous coat is still tacky. Dependant on ambient temperature, all three coats may be able to be applied in the same day.

   Allow the last coat to cure thoroughly. At room temperature (25°C), the coating will be sandable in about 24 hours, sooner at higher temperatures.
4. Wet sand the epoxy with 120-grit paper. 120-150 grit provides a good tooth for varnish adhesion, and scratches are easily filled by coats of varnish. Use finer grits with thinner finish coatings.
5. Apply two or three coats of varnish following the manufacturers recommendations.
6. Re-install trim. Be sure all fastener holes are sealed with epoxy. Bed in epoxy or flexible bedding compound.

ATL composites

ATL composites Pty Ltd
Tel (+61) 7 5563 1222
Fax (+61) 7 5563 1585
info@atlcomposites.com
www.atlcomposites.com
www.westsystem.com.au