

# WEST SYSTEM EPOXY IN ACTION

Leading boat builders from around the world use WEST SYSTEM® epoxy for sheathing, improving the strength, durability and water resistance of their hulls and decks. In the table below, we show you who's using our products and how:

## Sheathing application

Sheathing to strengthen and protect a wooden hull or deck

## Boat builders

- Spirit Yachts
- North Quay Marine
- Swallow Boats
- Enavigo Yachts
- W-Class Yacht Company
- Jubilee Sailing Trust (SV Tenacious)
- Boat Building Academy, Lyme Regis
- Princess Yachts
- Sunseeker International
- Enavigo Yachts

Sheathing to strengthen a hull following osmotic damage

- Berthon Boat Company
- Woodrolfe Brokerage (Tollesbury Marina)
- Suffolk Yacht Harbour
- Rice & Cole Boatyard



For more information about our WEST SYSTEM® epoxy resins and how they help boat builders make hulls and decks stronger and more durable, contact us today.

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## CASE STUDY: BUILDING TENACIOUS, THE WORLD'S LARGEST WOODEN TALL SHIP

The Jubilee Sailing Trust sheathed the hull of SV Tenacious, the world's largest wooden tall ship, with WEST SYSTEM® epoxy and fibreglass cloth. The ship's 900m<sup>2</sup> hull was completely sheathed with five applications of glass cloth over 22 days by a team of eight knowledgeable laminators, with on-site support from West System International. The fibreglass cloth was wetted out using two 1500mm wide impregnators which made it fast and easy to

apply the selected epoxy system: WEST SYSTEM 105 Epoxy Resin® with WEST SYSTEM 209 Extra Slow Hardener™.

Fourteen years after her maiden voyage, Tenacious is still providing life-changing experiences for able-bodied and disabled crew members. This beautiful ship will last through the ages thanks to the tenacity and expertise of her builders, and the strength and durability of WEST SYSTEM epoxy.

Application Brochure  
**SHEATHING**

**WEST  
SYSTEM®**

**PRO-SET®**

# USING WEST SYSTEM EPOXY WITH GLASS FABRICS

How boat builders can make hulls and decks stronger and more durable with WEST SYSTEM® epoxy and glass sheathing solutions



Photo: Spirit Yachts







To improve the safety and longevity of boats and minimise expensive after-sales repair work, many boat builders use modern wood epoxy composite construction techniques and sheath both hull and deck structures. This process uses glass and epoxy to reinforce the underlying substrate, making boats stronger, stiffer and more resistant to wear and tear in the harsh marine environment.

#### Choosing the right sheathing solution

Boat builders use many different types of glass cloth and synthetic resins for sheathing hulls and decks. However, many of these synthetic resins are unable to provide the required strength and durability.

Inexpensive polyester resin (commonly referred to as 'fibreglass resin') has, for example, often been used for sheathing, but this typically doesn't bond well to the underlying wood or fibreglass laminate. As a result, the sheathing layer can

crack or peel off in time, resulting in expensive repairs and potentially shortening the life of the vessel.

Generic, low-cost epoxies have been used in conjunction with fibreglass cloth for sheathing hulls and decks. Again, many of these lack the strength and water resistance needed to protect structural components in harsh marine environments and may demand working conditions that are impossible to achieve.

#### Achieving outstanding results with WEST SYSTEM epoxy products

To help boat builders and owners protect their boats long term, Gougeon Brothers, Inc. (GBI) developed a range of materials and products that are marketed under the WEST SYSTEM® epoxy brand. West System International (WSI) manufactures these products under licence, in partnership with GBI.

Developed specifically for boatbuilding, WEST SYSTEM®



products offer marked benefits compared to polyester resin and other epoxy systems, including greater strength, fatigue resistance and water resistance.

Since the 1970s, WEST SYSTEM epoxy has been extensively tested, both in the lab and in live trials with high-performance boats. This testing work has demonstrated the superior sheathing capabilities of WEST SYSTEM epoxy time and time again.

Our epoxies, which have a unique pedigree in the boatbuilding world, are used by Princess Yachts, Sunseeker International, Enavigo Yachts, Spirit Yachts and many others. In addition, they are used to bond, coat and sheath the hull of SV Tenacious, the world's largest wooden tall ship, built by the Jubilee Sailing Trust to provide life-changing experiences for disabled crew members.



## WHY WEST SYSTEM EPOXY FOR SHEATHING?

With WEST SYSTEM® epoxy, boat builders can protect the hulls and deck structures of new boats for longer. In addition, the superb adhesive qualities and moisture resistance of WEST SYSTEM epoxy make it perfect for repairing osmotic hulls.

The fact that WEST SYSTEM epoxy was developed for boatbuilding provides several unique advantages. The products have excellent 'wetting out' capabilities, which means they soak easily into the fibreglass cloth used for sheathing. Our application solutions – which include impregnators, rollers and spreaders, also ensure a first-class finish.

To ensure the success of our customers' sheathing projects, we provide excellent technical support, including on-site visits if appropriate.

Additional benefits of WEST SYSTEM epoxy for boat builders include:

- Superior strength with impact and abrasion protection**  
 WEST SYSTEM epoxy can be used to create sheathing that is extremely strong and durable, ensuring that hulls and deck structures are not damaged by impacts or abrasion below the water line. Our epoxy also provides more durable sheathing by creating uniquely strong bonds to the underlying substrate – whether it be wood, fibreglass or metal.
- Reduced lifetime maintenance costs**  
 WEST SYSTEM epoxy provides greater protection and improved longevity for new hulls and decks, delivering significant maintenance and repair savings over the boat's lifetime.



- Effective repairs for damaged vessels**  
 There are many cases where sheathing with WEST SYSTEM epoxy in conjunction with fibreglass cloth can extend the life of a vessel for many years after it has suffered severe water damage.

- A single solution for sheathing, bonding, filling and fairing**  
 WEST SYSTEM epoxy meets the full range of sheathing requirements, including sheathing for hulls and deck structures in conjunction with multiple types of fibreglass cloth and multiple application methods. Furthermore, the same epoxy can be used for bonding, filling and fairing, providing a complete, end-to-end boat building and repair solution.

- Made for boat builders**  
 WEST SYSTEM epoxy products have been formulated with the specific needs of boat builders in mind. The products include a selection of hardeners with different cure times, ensuring that boat builders can achieve the result and finish they need. In addition, our products can be applied at a range of temperatures and using a variety of application methods and tools, ensuring they meet boat builders' specific requirements.

- Technical support**  
 Often, boat builders need technical advice to ensure that their sheathing projects run smoothly. If required, we can provide training on sheathing with WEST SYSTEM epoxy and we can even offer on-site support for larger projects.

Hull sheathing for Tenacious, the world's largest wooden tall ship

## SHEATHING WITH WEST SYSTEM EPOXY: TECHNICAL OVERVIEW



### BEFORE YOU START

#### Choosing the right materials

The first step in any sheathing project is to choose the appropriate materials. For most small and medium-sized projects, boat builders will choose WEST SYSTEM® epoxy coupled with lightweight, woven fibreglass cloth.

For larger structures, or where high strength is required, multiaxial fabrics may be utilised. These yield more strength than woven fabrics because they are, in effect, unidirectional fibres overlaid at precise orientations with the layers stitched together. It is, therefore, possible to have biaxial, triaxial and quadraxial fabric plus 0/90deg fabrics. WSI's biaxial glass fabrics are available in different weights and sizes, depending on the requirements of your project.

Woven and multi-axial fabrics have a distinct benefit over chopped strand mat (CSM) fibreglass as these fabrics do not have a binder applied. CSM has an emulsion or polyester powder applied that holds the short chopped fibres together that must be dispersed into the resin system during the application process. However, the use of CSM with epoxy produces very poor results as there is no solvent present to disperse the binder. CSM is more often used with polyester resin.

Under normal conditions and temperatures (20-22°C), WEST SYSTEM 105 Epoxy Resin® can be combined with WEST SYSTEM 205 Fast Hardener®. For large projects that require more time, are in very warm conditions or where there are multiple layers of sheathing, hardeners such as 206 Slow Hardener® and 209 Extra Slow Hardener™ can be used. For clear coated finishes, any of the WEST SYSTEM woven fabrics up to 280g/m<sup>2</sup> provide good clarity, sufficient to see the wood

grain. Here the best choice is to use the WEST SYSTEM 207 Special Coating Hardener™ – see also our guide to clear coating.

#### Calculating epoxy volumes for a project

For sheathing, the weight of epoxy required is the same as the weight of the cloth that is to be applied to the hull or deck. If the cloth weighs 300g/m<sup>2</sup>, 300 grams of epoxy is therefore needed for each square metre. An additional 15% should be allowed for wastage.

#### Creating good working conditions

Sheathing using WEST SYSTEM epoxy is easier in warmer temperatures (18-25°C). The warmer the temperature, the easier it is to dispense and mix the resin and hardener. It is also far easier to 'wet out' fibreglass fabric at higher temperatures. Working indoors with adequate heating is the best solution. However, if work takes place outdoors, a tent may be erected around the boat and heated to ensure the epoxy can be applied easily.

#### Storing the epoxy

WEST SYSTEM epoxy and hardeners should be stored in a warm dry place or in a hot box to ensure they are easy to use when needed.



### THE SHEATHING PROCESS

#### Surface preparation

Surfaces to be sheathed should be clean, dry and thoroughly abraded with 80-grit paper.

#### Filling and fairing

Surfaces must be filled and faired using WEST SYSTEM epoxy and 407 Low Density Filler mixed to a peanut butter consistency. Applying an epoxy filler to any external angles will allow the fabric to be more easily applied. When the epoxy/filler has hardened, sand thoroughly before the epoxy/glass sheath is applied.

#### Applying the glass cloth

This can be achieved using two methods: the 'dry' method and the 'wet' method. The dry method is more commonly used with light cloth temporarily held in place

by tacks and 'wetted out' in situ. For the wet method, a thick layer of epoxy is rolled onto the surface to be sheathed and the dry cloth is unrolled into position over the wet epoxy.

#### Using peel ply

The use of peel ply in the sheathing process is extremely important. It is applied as the last layer of the process to protect the epoxy/glass sheathing and prevent the need to sand a cured epoxy-coated surface.

The peel ply can remain on the surface of the sheathing for a long period of time yet can still be easily removed. For more detailed descriptions of the sheathing process with WEST SYSTEM epoxy, visit our online sheathing guide: [www.westsysteminternational.com/en/support/publications-expert-guidance-for-specialist-epoxy-applications](http://www.westsysteminternational.com/en/support/publications-expert-guidance-for-specialist-epoxy-applications).