

RESTORATION OF THE To sail again



A major restoration of the America's oldest wooden ship is now under way at Mystic Seaport. *Stephen P Mack* sets out the ethos and philosophy underpinning the project and the museum



“the Morgan, properly restored, is a vast, encyclopedic document.”

Left: The whaler Charles W Morgan under sail in 1920

The Mystic Seaport Museum, without question, is going to great lengths to properly and accurately restore the last extant wooden whaling ship in the world, the 1841 *Charles W Morgan* to put to sea again. Setting aside for the moment such exotic things as laser 3D scanning, the work is being done just as repairs would have been made within a few years of the original build.

Each damaged piece is being removed by shipwrights and replaced in like manner with like materials and held in place with like fasteners. The shipwrights are most likely no more or less skilled than they were then. White oak is still white oak, and a pinched finger still provokes a rapid succession of expletives.

CHARLES W MORGAN



The Charles W Morgan rounds Lighthouse Pont on the way to her restoration berth at Mystic seaport

This type of work was neither fast nor inexpensive then, nor it is now. Why do they do this? Well ... it's a museum ship, of course. But why do it in what seems the most arduous, and expensive manner? Are there not more practical and efficient ways to achieve the same ends?

Why use hemp, an organic material prone to rot, for the standing and running rigging, when there is reproduction line that seems to last virtually forever? Why not incorporate the use of plastics, epoxy and resins? Substitute steel, aluminum and carbon fibre for wood? And, while it might be nice to see the ship floating, would it not be more efficient to make it an utterly static exhibit on land?

Again, since cost is an omnipresent factor, would it not be fiscally responsible to use the space aboard to encourage revenue? Why not a gift shop? The cargo hold below decks, now empty, could be utilized for offices or maybe a coffee bar? Should we build a modern Trojan horse-like structure to transport the public on and off the vessel?

Authenticity vs practicality is the usual billing for these debates and hot debates they can be. It's very expensive to restore a historic ship and equally, if not more, expensive to keep one long term, particularly to keep one well.

But do these two overworked words address the real question? And can the parties involved in these debates break through and address the real question: What's really going on here? What exactly are we trying to do?

Teaching without words

The *Charles W Morgan* is the oldest commercial sailing vessel in the United States and the last extant wooden whaling ship in the world. But in addition, the *Morgan*, properly restored, is a vast, encyclopedic document. Such a historic artifact teaches as no other means can. It teaches without words, spoken or written, without pictures. It transports us to and immerses us in another time and place. Another world.

It causes a type of experiential learning that builds on information already known; what it's like to be cold, or feel trapped,

tired, and hungry – or to sit on the deck on a most perfect day. It causes us to imagine. And that, by my standards, points to the highest level of learning.

On its own and without further interpretation, the *Morgan* lets us experience a whaling ship of the 1840s as though we have fallen through a time warp – be we maritime historians, professional shipwrights, or inner-city students on a class trip.

Were the vessel at the end of a voyage, before the crew was discharged, and ship's keeper put aboard, she would have been hard-scrubbed fore and aft, sails unbent and stowed, and all other tasks done to make her shipshape and ready for the next voyage. It is the vessel in this state that we are boarding.

There is no interpreter's desk, no stack of flyers with rock on top, no visitor signs or enlarged photographs screwed to the panelling or bulkheads. We are neither approached nor distracted by staff. Rather, the ship's keeper stands silently and smiles at us, making himself available to answer any questions we might pose. As we walk

“We feel the motion of the ship. It feels like a ship, it sounds like a ship, and it smells like a ship”



Moored on display at Chubb's Wharf, Mystic Seaport, prior to the start of the restoration

Charles W Morgan

Length on deck: 105ft (32m)
Length over spars 133ft (40,5m)
Beam: 27ft 7in (8.4m)
draught (reg; fully laden): 17ft 6in (5.3m)
Displacement: 314 tons
Sail area: more than 13,000sqft (1208m²)

“Attention to detail, research and authenticity appropriate to the most rigorous academic endeavour”

the decks and our eyes cast about, volumes of information pour in. It's in the planks, with the tar in their seams; in the hemp lines coiled at the belaying pins; in the towering masts and rigging. It's in the splices, whipping and mousing. The visitor need not know what it is to know that it is.

The ships speaks

The ship speaks – of labour and handiwork, of danger and discomfort, of adventure, of a so very different time. We go below, into the officers' salon. There is a great mess table where they will eat; the walls are handsomely panelled; a skylight overhead. It is as though the Captain will soon return. His bed sways on gimbals, a telltale compass overhead. There is his sea chest, and a mirror. Shafts of light angle in from deck prisms.

Moving forward, the officers' cabins doors are open. Inside, clothing of moderate quality hangs on wooden pegs. A sea chest is set at each berth. We may walk in unimpeded, sit on the berth or sea chest – there is no rope across the doorway.

We may sit there for an hour, and talk if we like. Or, just absorb the atmosphere. We walk through silent spaces. Then through the bulkhead into the hold. It is damp and pungent with little headroom, and the deck beams and knees overhead are

massive. We look down through a grating to the lowermost hold and bilges. It's dark down there and not very inviting. There are no props, signage or mannequins. We are as nieces and nephews of the ship's keeper, dropped off for the day and allowed to explore as our curiosity calls.

Then through the forward bulkhead, to the forecabin where the crew made their home for perhaps three years. The berths are crammed in, with cheap mattresses or a hay tick. A large brass lamp, centrally fixed, unpolished – undoubtedly a castoff from on-deck use – is the only light source. We immediately feel the crowding and squalid conditions of this airless space.

For a moment there is silence, and within that silence, is contained all the voices and all the happenings that have gone before. We feel the motion of the ship. It feels like a ship, it sounds like a ship, and it smells like a ship.

We climb a companionway ladder toward the light and are back on deck. We are more informed now, and see things differently than when we went below. We may linger and ruminate on this experience, or we may exit and continue to explore the Museum's grounds. But, it is unlikely that our short time aboard the *Morgan* will not be back in our thoughts in the near future.

At Mystic Seaport, this is the way they have done things since its inception in 1929. Reliable information is at the heart of all successful preservation. It means that the marine historian, professional shipwright and inner-city school child can trust that what they have seen, touched or photographed is correct. From the tar on the deadeyes to the splice on the anchor rode.

Reliable information

Delivering reliable information is the duty of the work and part of fulfilling a public trust. The information is a public document, as is the *Morgan*, and the public has paid for it, be it by corporate donations, grants, lottery funds, or the coins in the hand of that inner city child.

At Mystic Seaport, where they prize “Attention to detail, research and authenticity appropriate to the most rigorous academic endeavour,” they declare their goal to be “a prime example of excellence in public history.”

The ramp for boarding the *Morgan* is perhaps unnoticed by many who pass over it. Built heavily of unpainted wood, it looks as if it was constructed for the on and off loading of ship's cargo. It is elegant in its simplicity. It is a detail. But getting the details right is what's important.

THE CHARLES W MORGAN

The restoration begins

Ian Johnstone-Bryden describes the stages of the ‘Restoration Voyage’ that will one day see the 1841 whaler sailing again

September 27, 2008 marked the official inauguration of the five-year, \$8.5 million ‘Restoration Voyage’ of the historic American whaling ship the *Charles W Morgan* at Mystic Seaport, Connecticut. This portmanteau title for the project reflects both the journey of restoration, now well under way, and the actual voyage that the completed ship is scheduled to make in 2013, under sail, along the New England Coast.

Connecticut’s Mystic River was a centre of shipbuilding back in the late 17th century, building more than 600 ships, until the end of the Civil War in 1865, when the textile industry began to replace shipbuilding, though with some yards surviving through World War II. It was appropriate that wooden shipbuilding and maritime heritage preservation should make its

return, in 1931, to the site of a defunct textile mill on the Mystic River, now a permanent home for the Maritime Historical Association, incorporated in 1929.

The founders had a clear vision from the beginning that they would build a major living museum on the site. Now, 80 years later and now known as Mystic Seaport, a unique facility stands as testament to all those who have worked to fulfil this vision.

Complete 19th-century seaport

What has been constructed on the site of the old mill and the Greenman Brothers and Mallory family shipyards is nothing less than a complete 19th-century seaport, with all the essential services of quays, chandlers, sailmakers, shipwrights, dockyard, shiplift, shipsmiths and all the other services that a sailing ship could require.

Around them has been built a collection of exhibition halls and educational centres, including a planetarium. Some buildings are original to the site, some have been created in traditional style, others are historic buildings brought from other locations, but the real stars are Mystic Seaport’s ships, attracting visitors from all over the United States and around the world.

In November 1941, the last surviving square-rigged whaling ship, *Charles W Morgan*, was brought to Mystic Seaport. She had been displayed since 1926 in a sand berth at the Round Hill estate of Col Edward HR Green, where she had been badly battered by a hurricane in 1938. She was placed initially in a sand berth where she was to become the jewel in the crown of the museum’s collection, and a registered National Historic Landmark.

***Charles W Morgan*
rises on Mystic’s
shiplift before
being tracked to her
restoration berth**





Fisheye view of the interior

It was not until 1974 that the museum was able to haul the *Morgan* out, using the Seaport's own ship lift. It was found that she only needed a new false keel and some replacement planking. After repairs, she was returned to the water as a floating exhibit. In the following three decades she was subject to two partial restorations.

From her first hauling in 1974, the museum hoped to return her hull to sailing condition, but this was a daunting task. Without the facilities built up at Mystic, it is unlikely that full restoration would have been practical. It was not simply a matter of obtaining the funding, but of having a site where work could proceed for several years, halting temporarily if necessary.

Normally, the restoration of a 133ft (40.5m), 314-ton sailing ship would take place in a dry dock to avoid the stresses of hauling up a slip. A shiplift provides similar security because the vessel's weight is distributed over the cradle, increasing evenly as the lift platform emerges vertically from

the water. The difficulty many restoration groups face is the burden of occupying a costly dry dock for several years, or finding a shipyard that has a suitable lift and an area ashore where the vessel can be worked on over an extended period. Even annual refits can be prohibitively expensive in drydock charges. Mystic Seaport is in the happy position of having a suitable shiplift, and also a tracking system to bring the ship into one of three shore locations for work.

Skilled labour resource

The craftsmen, tools and workshop facilities are also part of the Museum's programs and exhibits, under their full control. Perhaps the most important resource is the skilled labour that has relearned otherwise lost skills that were common in the 19th century. Having key assets already funded reduces the burden on each restoration.

Even with the excellent in-house facilities, the restoration of the *Morgan* to sailing condition is a major undertaking.

As parts of the lower portions of the hull, not addressed by earlier efforts, will be inspected and worked for the first time since she was built in 1841, it is likely that the final costs will be even higher.

Another challenge is that wooden ships built in the early 19th century never had a full set of detailed drawings, the fine detail being part of the craftsmanship of the vessel. Any sets of plans that were drawn rarely survive complete a century and a half after launching. Then there is the work carried out by the crew, and small shipyards in many ports, during the working life of the vessel. Little of this work is recorded. As a result, the first stages of work on the *Morgan* have more closely resembled an archaeological site.

Before the *Morgan* could be moved from Chubb's Wharf, her masts, yards and rigging had to be removed ashore. Those working aboard were assisted by staff afloat in whaleboats of the type carried by the *Morgan* when she hunted whales. As much as possible was cleared away by hand, then a crane was used to unstep the masts and sway them ashore for storage. Each stage of the process was meticulously recorded and a team will examine the masts and yards to decide which must be replaced and which can be restored and used again.

On the morning of October 20, 2008, the *Morgan* was moved out from her quayside mooring and brought around Lighthouse Point toward the shiplift. Crowds assembled on the shore to watch the progress. A tug and a flotilla of smaller craft helped her on her journey, before lining her up for the shiplift cradle. The Hays and Ros Clark Shiplift was completed



Left: Shored up in her restoration berth ashore

in mid-2007 after five years of planning and construction. It replaces the original liftdock, built over 30 years ago. The new Shiplift is a Syncrolift system with eight individual winches lifting a platform 37ft wide by 120ft long (11.3 x 33.6m).

Once positioned for the shiplift, the *Morgan* was slowly raised from the water on November 1, then carefully towed along the tracks towards her restoration berth ashore. Alongside the berth, the cradle was winched away and a tower built to provide visitor access during the restoration.

Components labelled

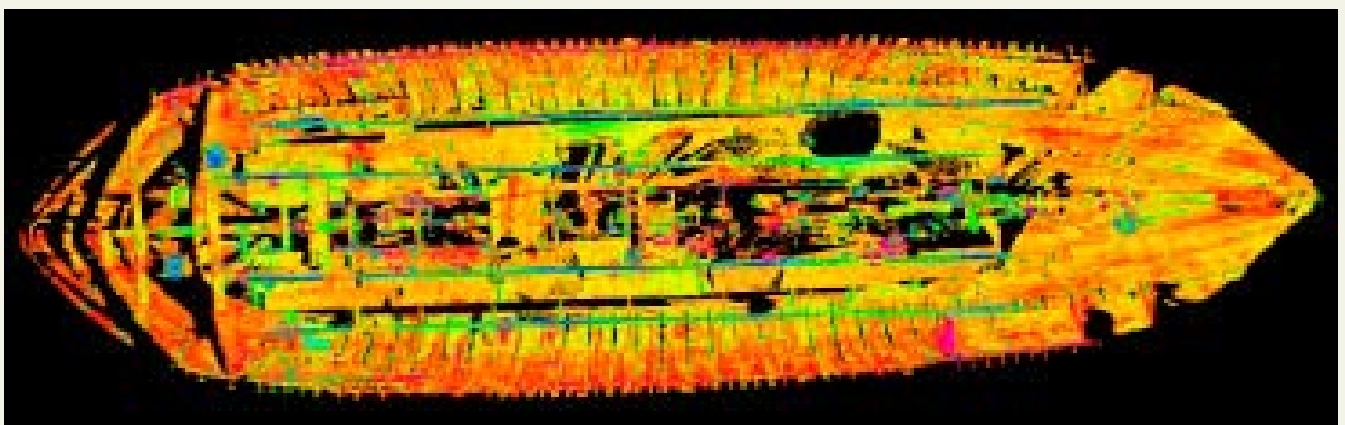
Now that the *Morgan* is in her restoration berth, it will be possible to manipulate the hull to fully restore the original lines, but first it was necessary to carefully strip out ceilings to expose the frames. At this point the hull resembled an archaeological 'dig' as each component was labelled and pho-

tographed in position. This confirmed that the ship was built from a number of different types of timber, including live and white oak, long-leaf yellow pine and short-leaf pine. Quentin Snediker, director of the duPont Shipyard who is overseeing the project, when asked to comment on what the shipwrights have discovered so far, said, "The good news is she is in just the condition we expected; the bad news is she is in just the condition we expected."

The restoration will see all timbers that can be reused returned to their original positions, replacing unsuitable components with the same type of timber originally employed in 1841. To cater for this requirement timber has been sourced from several locations in the United States, hundred-year-old trees felled by hurricanes being brought from the Mississippi Gulf Coast, South Carolina, and Galveston, Texas to provide live oak.

While the restoration will use many hand tools familiar in 1841, modern equipment will also be used to speed work and to maintain the highest standards of restoration. Although the *Morgan* has been in the care of Mystic Seaport since 1941 and much was known about her, an important early stage was to conduct a sonic survey. Sonic testing, which is also utilized to monitor wooden bridges around New England, provided a non-destructive method to indicate the condition of the framing, planking and fastenings.

The project is now moving into the restoration phase of the 'voyage' although the work of producing new components was well underway before the *Morgan* was lifted ashore. Fund raising continues to provide the flow of funds necessary to enable the work to be completed, and to see the *Morgan* returned to the water for her cruise along the New England coast. 🌐



Above: 3D laser model of the ship
Left: The laser scanner at work, linked to a laptop
Right: The green laser beam scanning the timbers



Green laser scanning revelations

The most innovative new method to be used is green laser scanning. Millimetric scanning was considered but the hideously expensive cost was not justified in a vessel that would be restored with traditional materials to 19th-century tolerances. Instead, Feldman Land Surveyors of Boston, MA, brought in their green laser scanners and 3D softwares, previously used on an Apollo space capsule and historic buildings.

The *Morgan* was the first ship they have scanned and, possibly, the first American historic vessel to be laser scanned in this way. The scanning is providing the most detailed imagery of the vessel, to an accuracy of 1/8in, with the 3D software translating the information into a very detailed set of engineering drawings, with 3D displays of the

vessel that can be viewed by the restorers from any angle. Michael Feldman of Feldman Land Surveyors commented, "Our firm has provided 3D laser scanning services from conventional projects such as buildings and highways to more obscure applications like the Apollo capsule and a dinosaur exhibit at the Museum of Science in Boston; however the scanning of the *Charles W Morgan* is unique.

"Capturing highly accurate, 3D data of the original materials of the ship has shown great potential for the application of 3D laser scanning and modelling to other historic vessels for preservation or reconstruction. Also, there is great value in having a permanent, digital, 3D archive of the way a vessel was originally built for future generations to see".