Feather Receives Significant Upgrades

Artisan Boatworks specializes in the restoration, storage, and maintenance of Concordia yawls and other classics from the same era, serving present-day owners who continue to sail and care for these remarkable boats. The yard is owned and operated by yours truly, Alec Brainerd. My team and I were honored this past winter to undertake a comprehensive aft-end restoration for Feather, a 1955 Concordia 41 yawl (#29). This project involved numerous separate tasks, upgrades of the sort these boats typically require to remain safe and relevant as they age. All the work was accomplished at our shop facility in Rockport, Maine.

The first photograph here (above left) illustrates the cockpit area prior to the commencement of this winter project. The other three photos were taken in April 2026, after the job had been completed. Rob Root served as the lead carpenter for all the modifications we made to Feather.

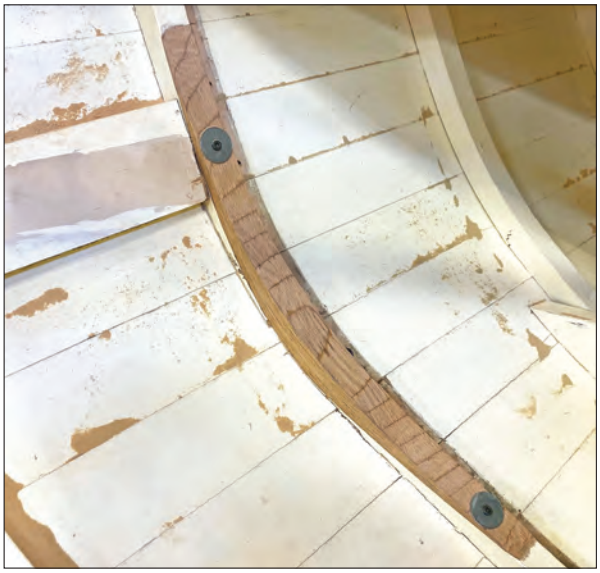
Photos by Alison Langley and Artisan Boatworks

Several years ago, a surveyor found some minor rot in the aft corners of Feather's cockpit, and he also identified several cracked frames aft, which were visible through the access openings at the forward end of the cockpit well. All seemed relatively stable at the time, so addressing these concerns was delayed until there was a convenient opening in our carpentry schedule. When we at last began to disassemble the boat's cockpit, however, a far more extensive issue was revealed: all 30 frames from the cockpit bulkhead to the transom were broken. Many had fractured in two or three places, and it's probable that these members had been compromised for a number of years.

Not long after Hurricane Carol in 1954, a great number of broken frames were discovered on Concordia 39 yawl #12, then named Kahala (now Absinthe). In response, Abeking & Rasmussen decided to reinforce all newly built yawls by installing 3' laminated sisters from the cockpit bulkhead forward to the mainmast location, locating them at the turn of the bilge and in the middle of every other frame bay. Meanwhile the Concordia Company crew on this side of the pond retrofitted all the earlier yawls in similar fashion, as warranty work.

This story is discussed in some detail in Waldo Howland's *A Life in Boats: The Concordia Years* (pages 153–157). Howland notes that installation of the sister framing was made easier thanks to the design of the interior joinerwork of Concordias, which could be readily removed using little more than a screwdriver. Beginning in 1959 with yawl #70 (launched as Banda, now Irian), all Concordia frames were laminated, and this change appears to have resolved the earlier problems with breakage.

It should be noted that this particular issue is not confined to Concordias. Many boats built with steam-bent frames and mahogany planking have suffered similar breaks, owing to the considerable expansive force exerted by mahogany when it swells across the grain—and this is especially the case with tight-seam construction. Such breaks often go undiscovered until portions of the interior cabinetry are removed and the turn of the bilge is exposed.



A rather common fix in such instances is to laminate sister frames next to or between the original broken frames, just as Concordia did. And this approach does seems to work. Yet given the considerable effort required to remove and then replace the cockpit (which involves far more time and expense than repairing the frames themselves), it seems suboptimal to leave broken frames in the after section of the boat. They may be sufficient to their task once sistered, but they present poorly and can reduce the boat's value.

Wooden boats are flexible, and they are remarkably good at spreading point loads and stresses over wide areas of the hull. But a single broken frame can start a chain reaction, leading to additional breaks along a line of planking or at the turn of the bilge. Adding a localized point of excessive strength (like a sister frame) can also be problematic, as this can prevent forces from radiating outward naturally. In smaller boats, it is not uncommon for sister frames to fracture right next to breaks in the original frames, sometimes resulting in an unfortunate knuckle in the hull.

In some cases, cleanly broken steam-bent frames can be healed: we trim back the wood on either side of the break to a 10:1 slope and laminate in a new segment which, once trimmed flush and smoothed, is virtually indistinguishable from the original (see photo at left). This sort of repair can readily be carried out in the center section of a boat like Feather, where the frames are long and there is good access for performing the work. Toward the ends, however, where the frames are shorter, and especially aft where the bends are tight, replacing the frames entirely is the only reasonable path. Presented with the choice between sistering Feather's broken frames, replacing them with new steam-bent oak frames, or installing new laminated oak frames, the boat's owner determined that there was only one way to proceed: perform the repair in the best manner possible, namely the third option.

We therefore proceeded to replace Feather's 15 pairs of broken frames with new laminated members. Rob Root and Kai O'Connor began the process by preparing blanks made up from 3/16" white oak flitches, which were bonded with West System G/flex epoxy.

Following precise patterning, the frame blanks were glued up at double thickness. In a technique relatively common in our trade, the blanks were then ripped in half lengthwise in order to create matching pairs of symmetrical frames, one for each side of the boat.

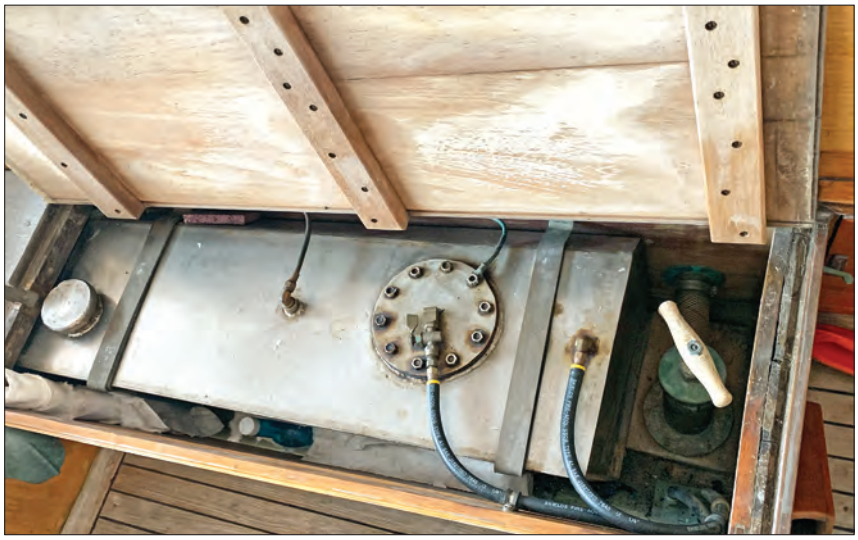
All frames were beveled inside and out to match the planking, and they were subsequently installed with new bronze screws and bolts that tied them into the sheer clamps and floor timbers.

During this entire process, we were quite careful to preserve the longitudinal fairness of the hull, and we were also able to eliminate a knuckle that had begun to form at the plank seam running along one line of breaks. Once the frames were replaced, the inside of the planking was refinished, using matte varnish in the upper portions and gray Interlux Bilgecoat below.

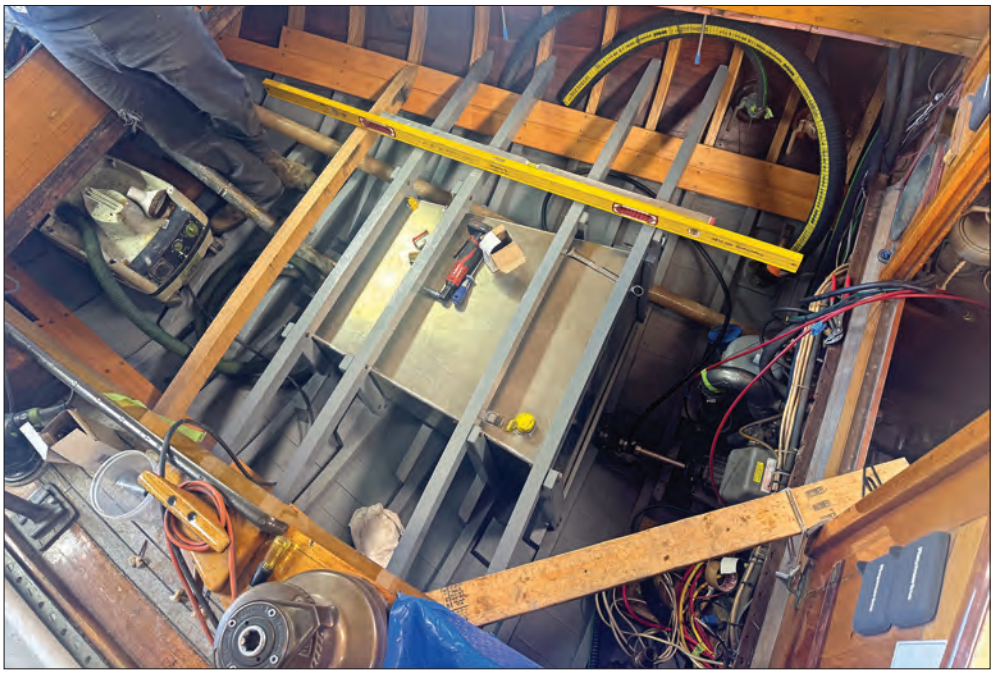
In contrast to new construction, repair projects nearly always unfold in two parts: there's the "fix what's broken" category, but also the "while we're here" category—with the latter often exceeding the scope of the former. This is particularly true in situations where considerable effort is required merely to gain access, and later to replace or reinstall everything that had to be removed. In Feather's case, we knew that we were going to be creating an entirely new cockpit. And we could either copy the original exactly or seek out possibilities for improvement.

Having long owned a comparable yawl myself (Nora, a 1961 S&S design), and having been involved with quite a few restorations and refits of similar boats from the same era, I had definite thoughts on how the cockpit of Feather could be improved. That said, I always feel morally obligated to respect the essential character of historically important boats, and I am ever mindful of the original intentions of their designers. Although Waldo Howland and Raymond Hunt are no longer around to offer up their opinions, my sense from reading Howland's books is that he was always seeking improvements, and was quick to take action when appropriate opportunities presented themselves. Much the same was true for Hunt.

I will now describe the modifications that we made in the course of reworking Feather's cockpit. These various changes were based on my own personal experience, and were also developed with much thought to the owner's intended use. Many readers will undoubtedly have different views on these matters, which is perfectly fine. Universal solutions are rare in the boating world, and that is one reason that we so enjoy building and restoring classic designs for knowledgeable clients with distinct preferences.



The standard Concordia fuel tank is located under the port cockpit seat, and holds around 20 gallons. Achieving additional storage space was a priority for Feather's owner, as was increasing range under power without the need to carry diesel fuel on deck in yellow jerry cans.



With the cockpit sole beams clamped temporarily in place, we patterned a new fuel tank to fit within the space between the tops of the floor timbers and the bottoms of the beams. The new custom tank, made from aluminum and seen here following its installation, holds a total of 45 gallons.

One big challenge in upgrading boats from the CCA Rule era for modern use is incorporating a propane system for the galley stove that is safe and ABYC compliant. Propane fumes are highly flammable and explosive – and unfortunately for boaters, they are heavier than air. This means that fumes escaping from a leaking hose connection or valve anywhere in a boat will flow to the lowest possible point. The intent of a proper installation is to ensure that in such instances, any leaking gas goes overboard and not into the bilge. The most likely place for propane fumes to leak is at the tank, and the best propane tank storage lockers are airtight and above the waterline, with a direct drain overboard that is also above the waterline. It's important to keep in mind that any water in a drain will block propane fumes from passing out.

The photo to the right, which was taken aboard the Aage Nielsen sloop Delphinus, shows a successful propane arrangement of a sort often seen, namely a sealed and vented locker recessed into the aft portion of the deck; Delphinus was built by Paul Luke in 1965, and the boat has been in Artisan's care since 2020. Replicating this sort of arrangement on a Concordia would be challenging, and would require giving up much of the lazarette.

Over the years, I have seen various "off-the-shelf" propane enclosures that can be located below decks, at least in theory. These units may technically meet the letter of the ABYC recommendations, but in my opinion they do not satisfy the intent, nor are they particularly safe. Any fumes that leak from an inadequately sealed lid or escape when the lid is opened will flow straight into the bilge. For Feather, we opted to build symmetrical watertight storage lockers in the aft quarters of the port and starboard cockpit seats. These lockers were made using 1/2" marine mahogany plywood sheathed with 10-ounce fiberglass cloth, and they have filleted corners and gasketed lids. The starboard side locker, which is dedicated to propane, provides secure mounting for the two tanks and is properly equipped with a drain leading directly overboard.

In my judgment, this cockpit seat locker location for propane storage is the best setup for a Concordia. In theory, given sufficient time and flow volume, fumes escaping the gasketed locker lid could flow into the cockpit footwell rather than overboard. Though water in the cockpit drains would block the flow of propane gas, those fumes could theoretically fill the footwell and then find their way down the companionway opening. In reality, however, I do believe that there is sufficient airflow in and around the cockpit to dissipate any fumes. All boats with propane systems should also be equipped at minimum with one propane sniffer in the lowest part of the cabin and another near the stove, connected to an alarm and an automatic shut-off valve at the tank.

Many Concordia yawls were built with a tee in the engine exhaust, splitting just aft of the engine and exiting at the waterline on both sides of the boat, outboard of the cockpit. When motorsailing, fumes are in theory directed to the leeward side of the boat by the venturi effect. Yet when powering on light-air days, exhaust can still manage to find its way to the cockpit area, in unpleasant fashion.

Removal of Feather's old cockpit soon revealed that the 1½" exhaust through-hulls on either side at the waterline were badly deteriorated and also not securely connected—and they had of course been nearly impossible to access for inspection and maintenance. In a new solution for the exhaust, we ran a single 2½" hose from the muffler to an exit point under the counter, echoing the setup seen on most modern boats. The combined cross-sectional area of two 1½" hoses is 3.5 square inches, whereas the comparable area of a single 2½" hose is 4.9 square inches. The original exhaust was likely of sufficient capacity for Feather's original Gray Marine gasoline engine, but it was definitely undersized for the 55-hp Yanmar diesel the boat carries today. The new exhaust—with a single run of larger hose and fewer fittings and bends—should significantly improve flow and reduce back pressure, and will also help to keep fumes away from the cockpit.

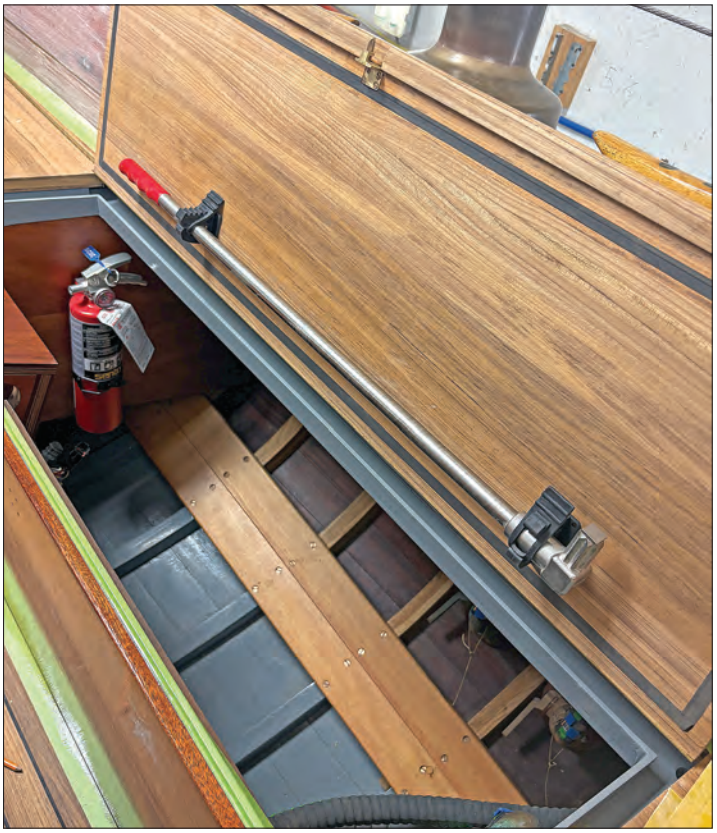
The photo just to the right shows the revised position of the exhaust outlet, now in the counter. The boat was in the paint bay at this point, with extra attention being necessary this year since the topsides were necessarily disturbed during reframing.

In Concordia yawls as built, accessing the area beneath the cockpit is difficult, and thus it is quite challenging to adjust the stuffing box, tend to the transmission linkage, or (heaven forbid) close a through-hull in an emergency. We determined that a primary goal of our redesigned cockpit would be to solve the issue of access to this particular area. One way of accomplishing that is to install a flush hatch in the cockpit sole, just aft of the bridge deck. Yet potential water ingress then becomes a consideration. And in Feather's case, the compass binnacle was in the way.

A preferable solution, in my opinion, is the manner in which things are arranged on Nora: rather than opening to an area extending down to the cockpit floor only, the cockpit seats open directly to the inside of the hull. Gutters and gaskets render the lids watertight, and there is ample space for an average-sized person to climb right in, and out the other side if desired. The lids can be tied open for light and ventilation during maintenance operations, and interior components can be safely accessed even while under way. The other advantage to deep lockers is that they provide more than adequate storage for multiple fenders and dock lines, a boarding ladder, and other gear. One loss with this arrangement is the T-shaped Concordia cockpit layout, which can be created by removing the forward sections of the port and starboard seats. We checked with quite a few Concordia owners, and most reported that they never take out those removeable seat panels.

Abeking & Rasmussen used solid mahogany boards for the cockpit coamings, lengths of solid teak caulked with cotton for the footwell, and solid teak for the seat tops. Though Feather's seat tops had held up for 70 years, it was clearly time for replacement. Rather than using solid hardwood once again, we opted to employ 1/2" marine mahogany plywood, to which we applied a 1/4" veneer of teak on both sides. This approach precludes any warping or checking, allows us to select for the best possible grain pattern and orientation, and provides ample thickness of solid wood for another 70+ years of wear. When veneering plywood, it is imperative that both faces of the substrate are veneered. If even a thin layer is bonded to one side only of a plywood substrate, the piece will warp like a potato chip.

Gaskets on the inside of each cockpit seat meet the tops of the inner drain gutters, and latches keep the seats fastened down tightly. Now that the seats open into the hull, these measures ensure that no water can make its way into the boat via the seat openings. This photo also shows the storage location for the handle that operates Feather's new Edson bilge pump.

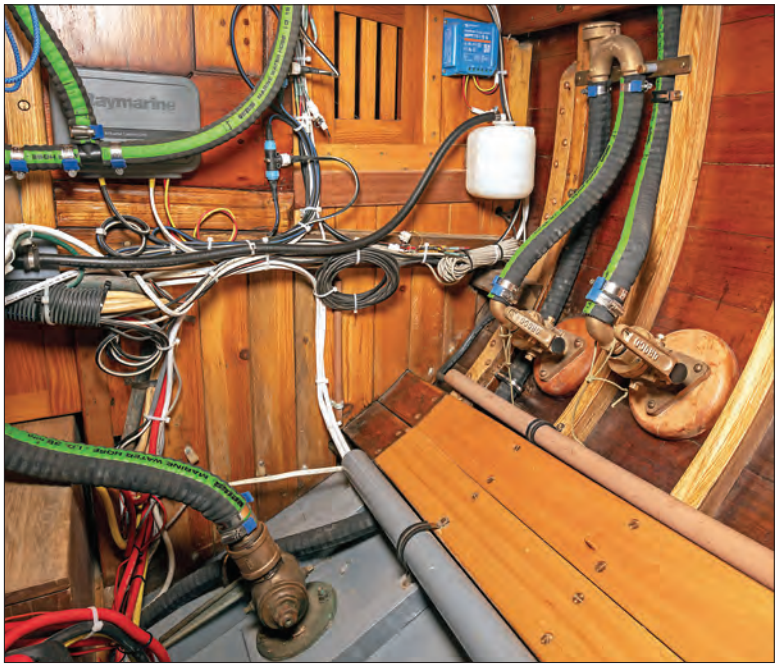


The original Concordia yawls all had manual piston-style bilge pumps in the cockpit lockers, and I have always loved how they pump directly into the footwell rather than overboard. I imagine it is gratifying for the person operating the pump to quantify the fruit of such labor, while simultaneously rinsing the day's accumulation of dog hair and cracker crumbs down the scupper drains. I fear, however, that only a small fraction of the manual bilge pumps out there are ever used, or are even functional. I would encourage all wooden boat owners to keep the hand pump operative and to regularly pump their bilges manually, rather than depending solely on electric pumps. A non-functional Concordia piston pump can often be revived by opening the cylinder from the top and introducing water to the pump leather. Replacement leathers are still available from Concordia Company.

For Feather, we purchased a new high-capacity diaphragm pump from Edson. This rugged unit has a bronze body, and it has been plumbed to discharge into the cockpit footwell, as near as possible to the scupper drains.

As is evident in the lower right of the photo below, Feather formerly had a very complicated assortment of drain hoses, all coming together in a manifold leading to the cockpit drains. Every time two hoses tee together, it means more fittings and clamps that can fail, as well as increased turbulence leading to reduced flow.

At the previous locations of the port and starboard exhaust through-hulls, Feather now has brand new 1" Groco through-hulls with seacocks, one serving the primary bilge pump and the other the secondary pump. Next to these are waterline through-hulls for the scupper/deck drains. To prevent any back-siphoning, the hoses from the bilge pumps travel up through vented loops just under the deck before dropping back down to the through-hulls. Now that the pumps and drains have dedicated through-hulls, each of the two main cockpit drains follows an unencumbered straight run down to its own through-hull. The great profusion of hoses, fittings, barbs, tees, and hose clamps formerly present has been much reduced, which is all to the good.



When we eliminated the lift-out seat inserts at the forward ends of the cockpit, this raised a question: what to do about the original bronze footwell portlight? The opening is such a distinctive Concordia element that it seemed wrong to eliminate it altogether. Yet it now opened into a dark cockpit locker.

It's always best when such a problem (or worse, an outright mistake) can be resolved by creating a net-positive detail that looks purposeful. Thankfully, my crew arrived at one of those brilliant solutions while determining a good place for mounting the new manual bilge pump. In order to position the Edson pump with the discharge low and near a cockpit drain—and have the removable handle pass through a slot in the footwell—the best position for our desired orientation was the forward end of the port cockpit locker, right where the portlight was located. It was also necessary to space the pump about 4" off the bulkhead, in order to afford adequate swing room for the handle.

There we were in the cabin one day, discussing the likely elimination of the portlight and wondering just how to patch the resulting 8" hole in a way that would match the surrounding varnished joinery. All of a sudden: voilà! Rob (or maybe it was Kai) came up with a brilliant idea: fashion a round wooden component of suitable thickness for mounting the pump, and finish it out on the other side as a galley storage nook—the door to which would be the bronze portlight. The owner approved of this clever suggestion, and the result was a success all around.

Nearly every Concordia originally had its engine instrument panel mounted at the aft end of the cockpit, where it is difficult to see when operating the boat and also vulnerable to rain and spray (given that it faces forward). For Feather, we instead opted to place the panel in a recessed box located forward in the footwell and on the port side opposite the shifter, where it is protected from the elements and easily viewed.

It has been deeply rewarding to address Feather's serious structural issues in a manner that respects the boat's original construction, and also to make carefully considered improvements appropriate to a Concordia. These various upgrades certainly preserve the yawl's spirit while significantly enhancing her reliability, usability, and comfort. I would especially like to thank Feather's owner, Will Brieger, for his willingness to undertake this project, and for placing his trust in our talented team to do the job right.

Alec Brainerd
Artisan Boatworks
Rockport, Maine

One last piece of the puzzle involved the engine controls. Purist Concordia owners may wish to stop reading here, for there is doubtless considerable pride associated with the acquired skill of managing the tiller with your legs while operating the throttle with your right hand and working the shifter with your right leg—all while docking the boat or picking up a mooring. After all, sailing is a sport. Non-purists, however, may rejoice to learn that Kobelt makes a beautiful all-bronze assembly that handles shifting and throttle control with a single lever. We positioned the control lever (seen below) on the right side of Feather's footwell, where it is easily reached. Also visible in the background is one of several bronze latches we installed, which keep the cockpit seats tightly sealed when closed.