

THE MARINE INDUSTRY IN 2030

GETTING TO SHIPYARD 4.0

The typical picture of an automotive plant shows a neat, orderly sequence of robots on a production line. You look out at your shipyard and see craftsmen, old buildings, and sections everywhere. These images couldn't be more different, yet shipyards and car plants have more in common than many realize. Integrated design and operations, thinking of the final product (a car or ship) as one instance of a configurable platform, and packaging digital alongside physical deliverables are revitalizing both industries.

In much of the world, shipyards are in trouble. Competition is intense, work is hard to win, and owners' expectations can be challenging to meet. The yards that continue to be successful—or that can be somewhat optimistic about the future—share several common traits. They

- have developed areas of specialization, whether for a type of vessel, vessel platform, or specific trade/craft, and have invested in making that capability best-in-class
- use technology to streamline planning and yard operations, and to connect the yard, office, design team, and owner
- optimize the yard layout to suit modern production methods, even on very old sites
- train workers using augmented and virtual reality tools to improve safety and bring new employees up to speed.

TRANSITION FROM OLD TO NEW(ER)

Many shipyards are victims of their success. They are old and established businesses, in their traditional locations, with many legacy work processes. Many still rely on functional silos based on historical patterns, with each using its own IT solutions—say, an enterprise resource planning (ERP) solution that doesn't talk to the design tools, limiting collaboration between departments. Worse, these silos make it difficult to find and trace problems because of differences in data structures, formats, naming, and so on.

These silos also make it difficult for a yard to be agile and responsive to change and collaborate with owners and project partners. Increasingly, yards cannot be experts in all aspects of a vessel's design and construction; they must rely on contractors and suppliers to form a ship delivery team. That can only happen when information is integrated and accessible to all who need it.

FIND DIFFERENTIATION

In some markets, unique vessel designs are a key differentiator, such as superyachts, where each is more luxurious than the last. In other markets, the trend moves the other way: from bespoke custom designs to configured products. Modern autos are configured based on platform designs. Buyers have a limited number of options for color and trim, wheel type, and interior fit-out. These configurations are determined in advance, so the automaker can plan how they will be built or assembled and ensure that each is profitable. Shipyards that adopt this concept and build ship "platforms," where there are a limited number of choices, can reduce design effort and create a more repeatable manufacturing process. Units can be pre-built, and the enterprise can focus on bringing to market the genuinely differentiated aspects of the design.

One variant of this is the US Navy's interest in building modified versions of existing ships at a fixed price. This contracting option is only possible—with confidence around cost and schedule— if a configured ship platform is the basis of the design. The buyer can select from a predetermined list of options. Outside that scope, the cost isn't covered by the contract.

We can extend that idea by building on the units/blocks strategy that's been around since the 1970s. Blocks break the ship into manufacturable chunks based on location within the ship rather than system type. Each block can be built independently and then assembled

on the ways. This gets the build process out of the weather and into more controlled conditions, where the processes can be digitized and automated. Quality and worker satisfaction go up, costs go down. But what if those blocks could be specialized? Weapons systems, propulsion, and other building blocks could become areas of differentiation.

We have already seen this in situations where yard consolidation, often seen as unfavorable, has enabled each yard to take on a differentiated function. In the US, for example, yards have specialized by vessel type and size. But it can also be a much more modest start, as one facility specializing in panel and section fabrication.

SHIPYARD 4.0 RELIES ON TECHNOLOGY

These proposals require more attention to and investment in IT infrastructures to coordinate design, yard operations, handover, and, potentially, fleet operations. This infrastructure must be open and scalable. It must create, store and distribute information to stakeholders while presenting specific data in their context. It should be possible for a naval architect to work with a planner, for example, to game out how a design change will be put into action, without needing to transfer data between silos.

Once data related to the ships, yard infrastructure, schedule, contractors, and more is available in one place and is trusted as accurate, yard managers can begin to optimize operations. A "smart shipyard," also sometimes referred to as a "Shipyard 4.0", makes use of technology to integrate production sites, connect equipment to monitoring and analytics platforms, and may include autonomous systems such as materials delivery by unmanned vehicles or robotic weld inspections.

These IT infrastructures will have other uses, as well. One key example is the creation of virtual and augmented reality capabilities for the yard. Virtual reality (VR) is an entirely digital environment where the operator practices tasks, for example. Augmented reality (AR) superimposed digital information onto a real-world scene, perhaps to help in a maintenance task. AR and VR can train new workers and lower safety risks in the hazardous environment of the yard. They can also attract technologically minded workers to a shipyard, building the workforce of the future.

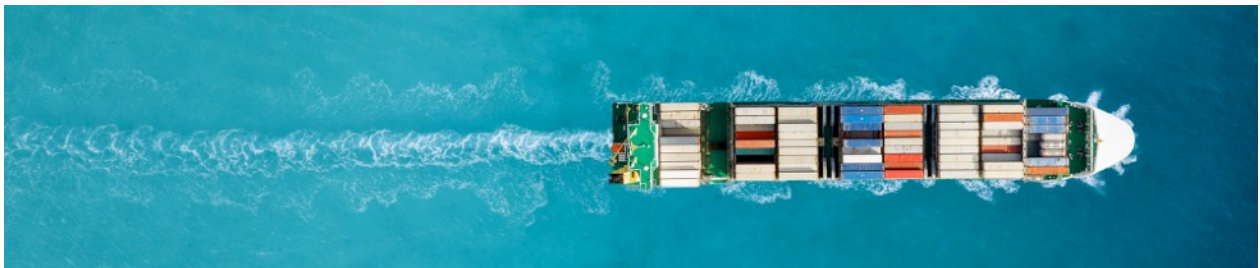
GET READY FOR 2030

Shipyards 4.0 is a goal that aims to use new technologies to improve performance. It can mean many different things depending on a yard's starting point and future ambitions. The term describes the potential created by today's design and manufacturing technologies, automation, and data exchange. How you define Shipyards 4.0 is as unique as your yard.

We're seeing companies across manufacturing use Industry 4.0 as a rallying cry to focus everyone on greater digitalization and all of the benefits that it carries. Shipyards 4.0 can optimize yard operations by connecting the design office to the planners to the yard's workshops. You can establish better communication between designers, contractors, and clients. In all, it can better align processes with client expectations—which, in turn, affects execution, efficiency, transparency, costs.

One last word on Shipyards 4.0: Digitalization isn't the end. These capabilities can also position your yard for new opportunities. You can move your business model from building ships to offering information-based products—such as digital twin technology, operating assistance, and other types—to your clients. That's a solid strategy forward.

TRANSFORM HOW YOU WORK, ENABLED BY DIGITALIZATION



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