The State of U.S. Naval Shipbuilding
Why a New Yard Is No Longer Optional

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Executive Summary

Purpose

This brief summarizes the findings of a broader study examining the ability of the U.S. naval shipbuilding and repair enterprise to support fleet operations in both peacetime and high-intensity conflict. It concludes that current shipyard capacity and workforce structure are insufficient to sustain fleet readiness, absorb battle damage, and execute recapitalization simultaneously. A new, purpose-built surface combatant shipyard is not an industrial preference, but a national security requirement.

Key Findings

1. **The industrial base is already saturated under peacetime conditions.**
   Public and private shipyards are operating with little to no excess capacity. Maintenance availabilities routinely extend beyond planned schedules, and new construction programs experience persistent cost growth and delivery delays. These outcomes reflect systemic constraints rather than isolated failures.
2. **Fleet design and acquisition decisions are misaligned with industrial reality.**
   Current force structure plans assume an ability to build, maintain, and repair ships faster than existing yard capacity and workforce pipelines allow. This mismatch creates hidden risk that does not appear in budget documents or ship counts but becomes decisive in wartime.
3. **There is no meaningful surge margin for battle damage repair.**
   Shipyard schedules are optimized for efficiency, not resilience. They lack the slack necessary to absorb emergent work at scale. In a peer conflict, even modest levels of battle damage would overwhelm repair capacity, extending downtime and permanently removing combat power from the fight.
4. **Workforce constraints are the primary limiting factor.**
   Skilled trades, planners, and combat system integrators require years to develop. Attrition, retirements, and competition from other industries have hollowed out experience levels. Without deliberate, long-term workforce investment, additional funding alone cannot generate throughput.
5. **The loss of repair and regeneration capacity directly constrains operational behavior.**
   When repair timelines are long and uncertain, commanders are incentivized to conserve hulls rather than employ them aggressively. This dynamic undermines deterrence, initiative, and sustained combat operations.

Strategic Implications

- **A fleet that cannot be repaired is a fleet that cannot be sustained.**
  Combat power is not defined solely by the number of ships in commission, but by the rate at which damaged ships can return to service. Industrial capacity is therefore an extension of the battlespace.
- **Adversaries will target time, not just platforms.**
  A peer adversary does not need to sink ships outright if it can impose damage that forces prolonged repair cycles. Industrial bottlenecks become strategic vulnerabilities.
- **Retiring high-capacity platforms without replacing their industrial and repair functions creates compounding risk.**
  Capability gaps are not limited to combat systems; they include the loss of command, integration, and regeneration functions that certain classes provided.

The Case for a New Shipyard

A new shipyard must be conceived as strategic infrastructure, not a traditional expansion of existing capacity. Its purpose should be to:

- Provide high-throughput, repeatable construction of surface combatants on a stable configuration baseline
- Execute rapid battle damage repair and modernization in parallel with new construction
- Reduce reliance on over-subscribed legacy yards
- Restore confidence that fleet losses and damage can be absorbed without strategic degradation

This yard must be designed around throughput, modularity, and repairability from inception, rather than bespoke craftsmanship or aspirational technology insertion.

Workforce Considerations

A new yard without a new workforce strategy will fail. Success requires:

- Long-term apprenticeship and certification pipelines
- Clear skill progression and retention incentives
- Predictable schedules and quality-first culture
- Recognition that skilled labor is strategic infrastructure, not a variable cost

Workforce morale and retention are decisive factors in industrial performance. Pride, predictability, and mission relevance matter as much as compensation.

Bottom Line

The United States does not lack shipbuilding ambition. It lacks shipbuilding margin.

Without a new, purpose-built surface combatant yard and a parallel investment in workforce depth, fleet expansion and modernization efforts risk producing nominal hull counts that cannot be sustained in war. Industrial capacity must be treated as a core element of deterrence and warfighting credibility.

Fleet design without industrial alignment is aspiration.

Deterrence requires the certainty of repair, regeneration, and endurance.

This study does not propose a specific ship design, acquisition program, or budget line. Its purpose is to examine the industrial conditions required to build, sustain, and regenerate any fleet the nation chooses to field.

Context and Motivation

For decades, U.S. naval superiority has rested on an implicit assumption that industrial capacity, though strained, would ultimately be sufficient to support fleet operations. This assumption was shaped by post–Cold War drawdowns, episodic conflicts, and an operational environment in which maritime combat losses were rare. As a result, shipbuilding capacity and ship repair infrastructure were optimized for efficiency under peacetime demand rather than resilience under wartime stress.

This assumption stands in stark contrast to the historical precedent that once defined American maritime power. During the Second World War, the United States transformed itself into a global industrial engine, constructing warships at a pace and scale unmatched in history. Dozens of hulls were under construction simultaneously across multiple yards, with dozens more on order, as shipbuilding became a national mobilization effort rather than a peacetime industrial activity. Production was driven by standardized designs, modular construction, and an industrial workforce measured in the hundreds of thousands. Shipyards were not merely suppliers to the fleet; they were an integral component of combat power, capable of replacing losses and expanding force structure faster than adversaries could inflict damage.

That industrial overmatch was decisive. It allowed the United States to absorb combat losses without strategic paralysis, sustain continuous operations across multiple theaters, and maintain initiative even in the face of heavy attrition. Crucially, wartime shipbuilding was not treated as an auxiliary function to naval operations. It was recognized as a core pillar of national defense, aligned directly with operational requirements and strategic objectives.

The modern United States no longer maintains that level of industrial elasticity. While the strategic environment increasingly resembles a contest of endurance rather than a short, decisive conflict, the shipbuilding enterprise has been optimized for efficiency, not replacement. Where wartime America treated shipyards as engines of national power, the current system treats them as constrained service providers. The contrast is instructive and consequential.

That strategic context no longer exists. The Navy now faces potential adversaries capable of contesting sea control, striking ships at long range, and sustaining pressure over extended periods. At the same time, the Navy is retiring large, highly capable ships faster than replacements can be delivered, while introducing new classes that depend on future technology maturation and stable industrial performance to achieve their promised capability.

The motivation for this study arises from the growing disconnect between fleet ambition and industrial capacity. Policy statements emphasize rapid acquisition, distributed lethality, and fleet expansion, yet shipyards struggle to meet existing commitments. Maintenance availabilities routinely overrun their planned durations. New construction programs experience design instability well into production. Workforce shortages limit the ability to surge or recover from disruption.

This is not a question of funding alone. Even when budgets are increased, shipyard throughput does not respond linearly. Physical constraints such as dry dock availability, crane capacity, and waterfront access impose hard limits. Human constraints, particularly the availability of skilled trades and experienced planners, impose even stricter ones. These realities shape what is possible in practice, regardless of what is authorized on paper.

The erosion of this industrial depth is not merely historical trivia; it defines the risk profile of any modern naval conflict. The purpose of this study is therefore to reframe shipbuilding as a strategic enabler rather than a supporting function. Fleet design choices that ignore industrial constraints create risk that is invisible during planning and exercises but becomes decisive in war. By examining current shipyard performance, potential wartime demands, and the requirements of a new yard and workforce, this study seeks to ground future fleet decisions in operationally relevant industrial reality.

Pacific and Atlantic Shipyard Schedules

The geographic distribution of U.S. shipyard capacity imposes structural limits that are frequently underestimated in fleet planning and acquisition strategy. Both the Atlantic and Pacific coasts host critical shipbuilding and ship repair infrastructure, yet neither possesses meaningful excess capacity. Existing yards are not lightly loaded resources awaiting additional demand. They are tightly scheduled industrial systems operating at or near maximum sustainable throughput.

Across both coasts, major shipyards are committed months to years in advance. New construction slots, maintenance availabilities, and modernization periods are allocated through long-range planning cycles that leave little discretionary capacity. In practical terms, the number of hulls each yard can produce or service in a given year is already fixed by workforce availability, dry dock capacity, tooling, and supplier throughput. Increasing output is not a matter of adding funding or issuing new tasking. It requires physical expansion, workforce growth, and multi-year lead times.

On the Atlantic coast, shipyards support a dense concentration of fleet units, including aircraft carriers, submarines, and surface combatants. Maintenance and modernization availabilities are planned years in advance and sequenced to avoid overlap that would exceed dock or labor limits. When unplanned growth occurs, whether due to deteriorating material condition, late discovery of work, design changes, or workforce shortfalls, delays propagate immediately across the schedule. Ships awaiting induction remain idle longer than planned, while ships already in availabilities occupy dock space and skilled labor beyond their scheduled windows. The result is not isolated delay, but cascading disruption affecting multiple hulls and mission areas.

The Pacific coast presents an even more constrained operating environment. Fewer shipyards and longer transit distances amplify the impact of every inefficiency. A ship delayed in entering availability does not simply shift its schedule; it loses operational availability during transit and waits longer for an open slot. When schedules slip, there are fewer alternate facilities capable of absorbing the work. Ongoing infrastructure modernization projects, while essential for long-term readiness, further reduce near-term capacity. In this environment, even modest deviations from plan routinely translate into multi-month or multi-year readiness impacts.

Crucially, current scheduling models assume a steady-state environment. They are optimized to maximize utilization under predictable conditions, not to absorb disruption. Availabilities are sequenced tightly to keep docks and labor continuously employed, leaving minimal slack. This approach improves apparent efficiency on paper, but it eliminates resilience. When additional work is required, there is no buffer available to absorb it without displacing another ship. Every deviation forces a trade between hulls, missions, or timelines.

From a warfighting perspective, this brittleness is unacceptable. Combat damage does not arrive according to plan, nor does it respect pre-allocated maintenance windows. It demands immediate access to dock space, skilled labor, and material. A shipyard system that struggles to absorb unplanned work in peacetime is structurally incapable of handling sustained battle damage in war. The absence of schedule slack is not merely an inconvenience or a management challenge. It is a strategic vulnerability that directly constrains fleet endurance and operational freedom.

These constraints reflect a deeper structural reality: U.S. shipyards are designed to deliver a fixed number of hulls and availabilities per year, not to surge beyond them. Each yard’s throughput is bounded by dry dock count and size, waterfront access, crane capacity, outfitting space, and, most critically, the availability of skilled labor. These factors establish a hard ceiling on how many ships can be built, repaired, or modernized concurrently, and that ceiling is reached under normal operating conditions.

There is no latent reserve of unused dock space or idle skilled labor waiting to be activated. New construction slots and maintenance availabilities are allocated months to years in advance precisely because capacity is scarce. When a yard commits to a hull, it is committing a finite share of its workforce, tooling, and dock access for the duration of that work. Adding an additional hull or extending an availability does not scale linearly. It displaces other ships, delays other missions, or forces suboptimal sequencing that degrades efficiency across the enterprise.

As a result, current yards can reliably produce and maintain the fleet they are already scheduled to support, but they lack the margin to absorb additional demand at speed. Surge capacity, in the traditional sense of rapidly increasing output to meet emergent wartime needs, does not exist in any meaningful form. What is often described as surge is, in reality, reallocation and delay. A system that can only respond to crisis by postponing other work is not resilient; it is brittle.

This represents a fundamental departure from earlier assumptions about industrial support to naval warfare. During the Cold War, U.S. naval planning explicitly treated shipyards as part of the warfighting system. Industrial surge was a core planning factor. Fleet size, ship class commonality, and yard capacity were aligned with the expectation of prolonged conflict and attrition. While peacetime efficiency mattered, it was subordinate to the ability to replace losses, repair damage, and expand output under mobilization conditions.

Shipyards operated within an ecosystem that included deeper labor pools, multiple facilities capable of similar work, and a production culture accustomed to scaling output. Standardized designs and shared systems enabled workload redistribution and recovery from disruption. Surge was imperfect, but it was deliberate and planned.

The modern shipbuilding enterprise is optimized for cost control, lean staffing, and steady-state efficiency. Designs are more complex, less standardized, and more tightly coupled to specific yards and suppliers. Workforce depth has been reduced, and experience is concentrated in smaller cohorts. Infrastructure is sized to meet forecast demand, not to exceed it. The implication is stark. Where Cold War planning treated industrial capacity as elastic and replaceable, modern planning treats it as fixed and fragile. The Navy has transitioned from a fleet backed by industrial surge to a fleet constrained by industrial throughput.

Current Results Produced by the Yards: Late or Over Budget

Recent shipbuilding and maintenance outcomes demonstrate a consistent and recurring pattern of underperformance relative to plan. Ships are delivered later than scheduled. Costs grow beyond initial estimates. Maintenance availabilities extend well past their planned durations. While individual programs often attribute these outcomes to unique circumstances, the aggregate picture reveals systemic issues that transcend any single yard, ship class, or acquisition office.

These results are not anomalous. They are predictable consequences of the way ships are currently conceived, designed, and introduced into production. The industrial base is being asked to execute programs that are structurally predisposed to delay, cost growth, and disruption.

One of the most significant contributors is design incompleteness at the start of construction. In multiple recent programs, hull construction has begun before designs were finalized to an executable level of detail. This practice transfers technical and integration risk from the design phase into production, where it is far more expensive and disruptive to resolve. When drawings are incomplete or immature, shipyards are forced into rework. Rework consumes skilled labor without producing forward progress, erodes productivity, and damages workforce morale. It also destabilizes sequencing, as trades must revisit completed areas to implement changes that should have been resolved before steel was cut.

Closely related, but distinct, is the issue of unfinished or immature technology. Modern naval platforms increasingly depend on advanced sensors, combat systems, power generation architectures, and software-intensive integration. When these technologies are not mature at the time they are committed to a hull, the yard becomes the de facto test environment. Hardware must be modified, interfaces revised, and supporting infrastructure retrofitted. Software integration extends beyond planned timelines. Test and certification cycles stretch, often repeatedly. The result is not only delay, but a loss of confidence in schedules that were built on optimistic assumptions about technology readiness.

A third and often underappreciated factor is platform integration complexity. Even when individual systems are mature, integrating them into a coherent, functioning warship remains a nontrivial challenge. Power distribution, cooling capacity, electromagnetic compatibility, combat system timing, and network architecture must all work together under real-world conditions. When platforms are designed around aspirational integration rather than demonstrated compatibility, the burden again falls on the shipyard. Integration issues surface late, after installation, when they are most difficult to resolve. These problems are rarely confined to a single system. They propagate across the ship, forcing redesign of spaces, routing, and support systems.

These three factors, unfinished designs, unfinished technology, and unintegrated platforms, interact in compounding ways. A change driven by technology immaturity may invalidate completed design work. A late design change may require revalidation of integration assumptions. Each iteration consumes time, labor, and schedule margin. In an industrial environment already operating at full capacity, there is no slack to absorb these shocks.

Workforce constraints magnify every one of these challenges. Skilled shipyard labor is neither interchangeable nor rapidly scalable. Welders, electricians, planners, and combat system integrators require years of experience to perform efficiently. When experienced workers retire or depart, they take with them tacit knowledge that is difficult to document and slower still to replace. New workers, even when available, require extensive training before reaching full productivity. During this ramp-up period, overall throughput declines, precisely when programs under stress most need stability.

Compounding workforce challenges is supply chain fragility. Many naval components are sourced from single or limited suppliers with long lead times. Design changes, late engineering updates, or integration issues often require components to be reordered or modified. In a tightly sequenced production environment, delays in material delivery can idle entire work packages. Trades cannot advance without parts, and downstream tasks are forced to wait or resequence inefficiently. These disruptions ripple across multiple ships and availabilities, amplifying their impact.

The cumulative effect is an industrial base operating in a state of continual recovery. Shipyards are rarely executing against plan. Instead, they are constantly adjusting to deviations caused by upstream instability. They are not failing outright, but neither are they delivering consistent, predictable outcomes. Schedules are met through extraordinary effort rather than robust process. Costs are controlled only after growth has already occurred.

This condition may be survivable in peacetime, when delays can be absorbed and budgets adjusted. It is wholly inadequate for wartime demands. A system that requires heroic effort to meet baseline commitments has no capacity to surge. When disruption becomes the norm rather than the exception, as it would under combat conditions, the system will not bend. It will break.

The persistent pattern of late delivery and cost growth is therefore not a shipyard performance problem in isolation. It is the manifestation of a deeper misalignment between acquisition practices, platform ambition, and industrial reality. Until designs are stabilized, technologies matured, and integration risk reduced before production begins, the outcomes produced by the yards will remain predictable and predictably late.

What If: How Would the Yards Handle Battle Damage?

To assess wartime readiness honestly, one must ask how the current shipyard system would respond to sustained combat damage. This question exposes the limitations of existing capacity more clearly than any peacetime metric.

Battle damage introduces work that is both urgent and unpredictable. Structural repairs, system replacements, and combat system recalibration must often be performed simultaneously and under time pressure. Unlike planned maintenance, battle damage cannot be deferred without operational consequence. Ships either return to the fight quickly or are effectively removed from the campaign.

In a peer conflict, shipyards would face multiple simultaneous demands. Damaged ships would arrive needing immediate attention. Routine maintenance would still be required to keep undamaged ships deployable. New construction would be needed to replace losses. At the same time, adversary actions could disrupt supply chains or target logistics infrastructure.

Under such conditions, the limiting factors become stark. Dry dock availability constrains how many ships can be worked on at once. Skilled labor limits how fast repairs can proceed. Testing and certification requirements ensure safety and effectiveness but add time. None of these constraints can be waived without risk.

If repair timelines stretch from weeks to months, operational commanders must adjust their behavior. Ships become assets to be preserved rather than tools to be employed aggressively. The fleet's ability to sustain pressure declines, even if nominal ship counts remain unchanged. In this way, industrial limitations translate directly into operational caution and strategic vulnerability.

Implications of Fleet Capability to Fight a Real War

An objective assessment of wartime readiness requires examining how the current shipyard system would respond to sustained combat damage. This scenario highlights capacity limits and structural constraints more clearly than any peacetime performance metric.

Battle damage generates work that differs fundamentally from planned maintenance. Damage arrives without warning, varies widely in scope, and often affects multiple systems simultaneously. Structural deformation, flooding, propulsion impairment, power distribution faults, sensor degradation, and combat system disruption frequently occur together. Effective recovery requires parallel repair across multiple disciplines rather than sequential tasking. Unlike scheduled availabilities, battle damage repair cannot be deferred without immediate operational consequence. A ship either returns to service within a defined window or is functionally removed from the campaign.

In a peer conflict, shipyards would be required to absorb several concurrent demand streams. Damaged ships would arrive requiring immediate access to dock space, labor, and material. Routine maintenance for undamaged ships would still be necessary to sustain baseline readiness. New construction would be required to replace combat losses and preserve force structure. These demands would occur simultaneously rather than sequentially. In addition, adversary actions could disrupt transportation, logistics nodes, and supplier production, further constraining available resources.

Under these conditions, capacity limits become explicit. Dry dock availability defines how many ships can be worked on concurrently. Dock size and configuration constrain which hulls can be accepted. Skilled labor availability governs the rate at which repairs can proceed once a ship is inducted. Specialized trades such as structural welding, electrical repair, combat system integration, and nondestructive testing are not interchangeable and cannot be rapidly expanded. Testing, certification, and safety requirements further extend timelines and cannot be bypassed without introducing unacceptable risk.

The current shipyard system lacks excess capacity in each of these categories. Dock space is fully allocated under peacetime schedules. Skilled labor pools are sized to meet planned demand rather than surge requirements. Supply chains are optimized for predictable consumption rather than rapid replacement of damaged components. As a result, the system responds to emergent work by reprioritization rather than expansion. Ships are moved forward or backward in the queue. Other availabilities are delayed. Output is redistributed rather than increased.

If repair timelines extend from weeks to months, the operational impact is measurable. Ships awaiting repair cannot contribute to ongoing operations. Replacement hulls cannot be delivered quickly enough to offset temporary losses. Fleet commanders must account for prolonged reductions in available forces when planning operations. Even if total inventory remains unchanged on paper, effective combat power declines due to the time required to restore damaged units.

This dynamic creates a direct linkage between industrial capacity and operational behavior. When regeneration timelines are long and uncertain, commanders are incentivized to preserve hulls and avoid risk that could result in prolonged loss of availability. The fleet becomes constrained not by enemy action alone, but by the time required to recover from it. In this way, limitations in shipyard capacity translate directly into reduced operational tempo and diminished strategic flexibility.

From an analytical standpoint, the conclusion is straightforward. A shipyard system that struggles to absorb unplanned work in peacetime lacks the capacity to process sustained battle damage in wartime. Without additional dock capacity, workforce depth, and material resilience, the ability to repair and regenerate combat power becomes a limiting factor in any prolonged maritime conflict.

Implications for Fleet Capability in a Protracted Campaign

In a protracted maritime campaign, the limiting factor on fleet effectiveness is not initial force structure, but regeneration rate. The ability to restore damaged ships to operational status within defined timelines determines whether combat power can be sustained across successive phases of conflict. When repair capacity is insufficient, losses accumulate even in the absence of ship sinkings. Time out of service becomes functionally equivalent to attrition.

As regeneration timelines lengthen, the effective size of the fleet contracts. Ships awaiting repair are unavailable for tasking, escort, or presence missions. Crews are reassigned or held in reserve. Maintenance debt grows as minor damage that could have been corrected early compounds into more extensive repair requirements. Over time, the fleet transitions from a rotational deployment model to a constrained availability model, where operational planning is shaped primarily by industrial throughput rather than tactical or strategic preference.

In this environment, operational risk management changes. Commanders must account not only for the probability of damage, but for the downstream impact of repair delays. Ships that incur damage are removed from the order of battle for extended periods. Replacement capacity is slow to arrive. As a result, the fleet's ability to maintain pressure, respond to contingencies, or exploit opportunities degrades over time, even if adversary losses remain comparable.

The industrial base thus becomes a pacing element of the campaign. Adversaries that can impose repair-intensive damage without sinking ships may achieve strategic effects by forcing prolonged reductions in fleet availability. This dynamic favors strategies aimed at saturation, cumulative damage, and operational exhaustion rather than decisive engagements. The side with faster repair and regeneration cycles gains a compounding advantage.

One mitigating factor is the ability to conduct forward or near-forward repair to reduce demand on fixed shipyards. The current surface fleet possesses limited organic capacity to conduct battle damage repair beyond basic casualty control and minor corrective actions. As a result, ships requiring structural, propulsion, or combat system repair must withdraw to major yards, increasing transit time and consuming scarce dock capacity.

The role of a dedicated surface fleet tender becomes increasingly relevant in this context. Such a platform would provide intermediate repair capability, logistics support, and technical services that could return lightly or moderately damaged ships to service without full shipyard induction. This capability would not replace fixed yards, but it would reduce the volume and urgency of work flowing to them, effectively increasing overall system resilience.

The implications of surface fleet tenders, including their optimal configuration, deployment model, and integration with existing logistics and maintenance structures, warrant focused analysis. This study identifies the absence of such capability as a contributing factor to regeneration bottlenecks but does not attempt to resolve it here. A subsequent study will examine the role of surface fleet tenders as a force multiplier for industrial capacity and fleet endurance in sustained maritime conflict.

From an analytical standpoint, the conclusion is that fleet capability in a protracted campaign is bounded as much by repair and regeneration capacity as by initial combat power. Without mechanisms to shorten repair timelines and distribute maintenance workload, the fleet's effective strength will decline over time, independent of platform survivability or tactical proficiency.

What a New Yard Must Be Capable Of

Any expansion of shipyard capacity must be treated as strategic infrastructure, not as incremental industrial growth. Whether achieved through construction of a new facility or modernization of an existing one, the objective is the same: to create predictable, high-throughput capacity for the construction, maintenance, and repair of surface combatants under both peacetime and wartime conditions.

At a minimum, such a yard must support serial production of a stable ship design. Configuration control is essential. Throughput depends on repeatability, disciplined baselines, and minimized variation. Designs that continue to evolve after production begins undermine yard efficiency and must be structurally constrained. The yard must also possess integrated facilities for combat system installation, integration, and testing to reduce dependence on external sites and avoid schedule fragmentation.

Dry dock capacity must be sized not only for the nominal hull classes assigned to the yard, but with margin for battle damage repair. Dock geometry, crane reach, and waterfront access must support parallel work on multiple hulls. Repair capability must be a core mission rather than an auxiliary function. Structural repair, propulsion replacement, power system restoration, and combat system reactivation must be executable without full teardown or long induction delays. Layout and workflow should be designed to enable parallel tasking and rapid system swaps, minimizing bottlenecks and idle labor.

Governance is equally critical. Any yard tasked with high-throughput output must be protected from continual design change. Configuration stability is a prerequisite for productivity. Changes should be driven by validated operational necessity and introduced in controlled blocks, not through continuous modification. Without this discipline, neither new construction nor repair throughput can be sustained.

Modernization Options for Existing Shipyards

Modernizing selected existing yards may provide near- to mid-term capacity improvements if physical constraints and geographic considerations allow. Candidate sites must already possess deepwater access, heavy-lift capability, and an existing industrial base that can realistically be expanded.

East Coast Modernization Candidates

Philadelphia Naval Yard, Pennsylvania

The Philadelphia Naval Yard offers a unique opportunity for modernization without the congestion constraints present at Norfolk. While no longer a primary Navy shipbuilding site, Philadelphia retains extensive waterfront infrastructure, dry dock capability, rail and road connectivity, and proximity to a large skilled labor market. Modernization could focus on restoring surface combatant construction and repair capacity without competing nuclear maintenance demands. The site's urban integration and existing industrial zoning present challenges, but they are offset by available footprint and the ability to reconstitute a historically proven shipbuilding location.

Bath Iron Works, Maine

Bath Iron Works remains a critical surface combatant production site with a highly experienced workforce. Modernization could emphasize expanded repair and modernization capacity alongside new construction, as well as improved outfitting and combat system integration facilities. Geographic location and workforce pipeline constraints would require targeted investment, but the yard's specialization in surface combatants makes it well suited for focused upgrades.

West Coast Modernization Candidates

Puget Sound Naval Shipyard, Washington

Puget Sound provides extensive repair expertise and proximity to Pacific Fleet units. Modernization could include expanded surface combatant dry dock capacity, improved logistics flow, and enhanced electrical and combat system repair facilities. As with other public yards, nuclear maintenance demands compete for resources, and effective modernization would require structural separation of surface combatant work to avoid continued scheduling conflicts.

San Diego Regional Industrial Base, California

While not a single consolidated yard, the San Diego region hosts multiple facilities supporting surface fleet maintenance. Focused investment could consolidate and expand dry dock and modular repair capability for surface combatants, reducing transit times and relieving pressure on Pacific Northwest facilities. Space availability, environmental permitting, and coordination across sites would be central challenges.

New Yard Options

Modernization alone is unlikely to provide sufficient surge margin or long-term capacity growth. Purpose-built new construction offers the opportunity to design throughput, repair integration, and workforce flow from inception.

East Coast New Yard Option

Southeastern Atlantic Coast

A new yard located along the southeastern Atlantic coast would benefit from deepwater access, proximity to major fleet concentrations, and access to growing labor markets. Purpose-built design could avoid nuclear entanglement, focus exclusively on surface combatants, and incorporate modular construction and repair facilities sized for sustained throughput. Location selection would prioritize available land, transportation infrastructure, and resilience against disruption.

West Coast New Yard Option

Southern California or Baja-Adjacent Pacific Coast

A new West Coast surface combatant yard located south of existing Pacific Northwest facilities would reduce geographic concentration risk and shorten transit distances for Pacific Fleet units. Purpose-built infrastructure could focus on serial production and rapid repair without competing nuclear maintenance demands. Workforce availability, housing affordability, and seismic considerations would be central to site selection.

Additional New Yard Options:

Texas Gulf Coast

A new surface combatant shipyard on the Texas Gulf Coast would provide geographic diversification, access to deepwater ports, and proximity to a large industrial and skilled labor base. The region benefits from existing heavy industry, fabrication expertise, energy-sector supply chains, and favorable logistics connections. A Gulf Coast yard would also reduce reliance on Atlantic and Pacific facilities by providing a centrally located option capable of supporting both fleets via transit routes.

From a resilience perspective, a Texas Gulf Coast yard would add redundancy against regional disruption and distribute industrial risk. However, considerations include hurricane exposure, environmental permitting, and the need to ensure adequate protection and hardening of critical infrastructure. These factors do not disqualify the region but must be incorporated into yard design and siting decisions.

Including a Gulf Coast option strengthens the analysis by acknowledging that future capacity expansion should not be confined solely to traditional shipbuilding geographies. Strategic dispersion of industrial infrastructure is itself a form of risk mitigation.

Great Lakes Shipyard

Technical and Structural Feasibility

A Great Lakes shipyard is technically and industrially feasible, but it is constrained by geography, hydrology, and infrastructure in ways that fundamentally shape the classes of vessels it can support and the role it can play in fleet readiness. The Great Lakes system provides deepwater access, a mature heavy industrial base, and an established maritime workforce. These attributes make inland shipbuilding viable from an engineering and labor perspective.

However, any naval shipyard located on the Great Lakes is constrained by the Saint Lawrence Seaway system, which defines the maximum size, draft, and air draft of vessels that can transit between the lakes and the open ocean. These constraints are fixed physical limits rather than operational assumptions. As a result, a Great Lakes shipyard cannot function as a full-spectrum blue-water combatant production facility. Its value lies instead in supporting a defined subset of naval missions if its role is deliberately scoped and aligned with these constraints.

Vessel Size and Class Constraints

The Saint Lawrence Seaway establishes clear upper bounds on vessel dimensions. Ships transiting the system are limited to approximately 740 feet in length, 78 feet in beam, 26.5 feet in draft, and 116 feet in air draft. These limits immediately preclude construction of aircraft carriers, large amphibious assault ships, large cruisers or capital ships, and very large logistics vessels.

Within these bounds, however, a meaningful range of naval platforms can be supported. A Great Lakes shipyard could accommodate frigates, corvettes, offshore patrol vessels, light destroyer variants constrained by size, fleet auxiliaries designed within Seaway limits, surface fleet tenders, unmanned surface vessel motherships, and certain sealift and logistics vessels. Many modern frigate and patrol combatant designs already fall within or near these envelopes. The critical requirement is design discipline. Any vessel intended for Great Lakes construction must be sized intentionally for Seaway transit from the outset, as post-construction growth margins are limited.

Potential Roles Within the National Shipyard System

A Great Lakes shipyard would not replace coastal yards. Its value lies in specialization and system-level load balancing rather than comprehensive capability.

One primary role would be the serial production of medium surface combatants such as frigates, escort vessels, and modular surface combatants. By isolating these classes from congested Atlantic and Pacific yards, inland production could reduce pressure on coastal facilities and improve overall system throughput.

A second role would be the construction of fleet tenders and support vessels. Surface fleet tenders, repair support ships, and modular logistics platforms benefit from industrial focus during construction rather than immediate proximity to open-ocean waterfronts. A Great Lakes yard is well suited to this mission set.

A third role would be repair, modernization, and refurbishment of vessels already operating within Seaway constraints. This includes mid-life overhauls, structural refurbishment, system modernization, and hull and machinery work. In this capacity, a Great Lakes yard could materially relieve coastal repair backlogs and increase fleet availability without competing for scarce coastal dry dock space.

Strategic Benefits

Several strategic benefits emerge from a Great Lakes shipyard when evaluated at the system level.

First, geographic security and survivability are improved. An inland yard is distant from coastal missile threat axes and outside direct maritime strike envelopes. This geographic separation reduces vulnerability to early disruption in a conflict and increases industrial resilience.

Second, the Great Lakes region offers substantial industrial base depth and workforce availability. The region possesses a long-standing heavy manufacturing heritage, a skilled trades culture, and existing steel, fabrication, machining, and transportation infrastructure. These characteristics reduce startup risk relative to greenfield coastal sites and shorten the timeline to operational capacity.

Third, a Great Lakes yard reduces coastal congestion. By offloading medium combatant production and refurbishment inland, coastal yards can focus on nuclear platforms, large hulls, and complex overhauls. This redistribution reduces scheduling conflicts and improves repair throughput across the entire shipyard enterprise. At the system level, this load balancing may represent the greatest value proposition of an inland yard.

Structural Weaknesses and Limitations

Despite these advantages, a Great Lakes shipyard has inherent limitations that must be acknowledged.

All vessels must transit the Saint Lawrence Seaway to reach operational theaters. This introduces seasonal constraints due to ice, dependencies on lock availability, and potential single-point transit vulnerabilities. These factors limit surge responsiveness and require careful scheduling.

Design lock-in is another constraint. Once a ship is designed to Seaway limits, it cannot exceed them later. Growth margins for future modernization are therefore more constrained than for ocean-built ships.

Environmental and regulatory complexity is also significant. Great Lakes shipbuilding must navigate stringent environmental regulations, binational coordination requirements, and complex permitting processes. These factors increase planning timelines and necessitate deliberate governance structures.

Finally, a Great Lakes yard is not suitable for all combatant classes. It cannot replace coastal capital shipyards, support very large hulls, or serve as a primary battle damage repair hub during active conflict. Its role must remain complementary rather than comprehensive.

Analytical Conclusion on Feasibility

A Great Lakes shipyard is feasible, useful, and strategically valuable if its role is clearly bounded. It should not be treated as a substitute for Atlantic or Pacific shipyards, nor as a general-purpose naval construction site. Its optimal contributions are serial production of medium surface combatants, construction of fleet tenders and support vessels, repair and modernization of Seaway-constrained ships, and strategic diversification of the industrial base.

Used correctly, a Great Lakes shipyard increases industrial resilience, reduces coastal congestion, and adds depth to the national shipbuilding enterprise. Used incorrectly, it risks becoming a constrained facility mismatched to fleet requirements. From a system perspective, it should be evaluated as a node within a diversified shipyard network designed for endurance rather than peak output.

Binational Supply and Binational Construction Opportunity

A Great Lakes shipyard introduces an industrial characteristic not present in coastal shipbuilding: inherent binational integration. The Great Lakes maritime and industrial ecosystem spans both the United States and Canada, creating conditions for cross-border supply, workforce participation, and coordinated production that are structurally difficult to replicate elsewhere. If deliberately leveraged, this environment offers an opportunity to expand naval production capacity in alignment with allied interoperability and collective defense objectives.

From a supply perspective, the Great Lakes region already functions as a binational industrial corridor. Steel production, heavy fabrication, machining, electrical equipment manufacturing, and transportation infrastructure operate across the U.S.–Canada border as part of an integrated commercial system. A shipyard located within this ecosystem could source components, subassemblies, and raw materials from both nations, reducing reliance on coastal or overseas supply chains and lowering single-point supplier risk.

Binational sourcing also enables parallel production. Modules, hull sections, outfitting packages, and support equipment can be fabricated simultaneously on both sides of the border and integrated at the yard. This approach aligns naturally with modular shipbuilding practices and allows surge capacity to be achieved through distributed manufacturing rather than physical expansion of a single facility.

Beyond supply, binational construction expands workforce options. The Great Lakes region contains skilled trades and engineering talent across both nations with shared industrial standards, language, and safety culture. Structured cross-border labor participation through temporary assignments, shared training pipelines, or coordinated certification standards could expand the available talent pool, particularly for specialized trades that are chronically undersupplied.

At the strategic level, a binational shipbuilding and repair model extends beyond national capacity. It creates a pathway for allied production integration that moves past component sourcing into coordinated construction and sustainment. NATO naval forces increasingly operate common or closely related platforms. A binational yard structure could support standardized hulls, shared systems, and interoperable sustainment practices across allied fleets.

This represents a shift from national shipbuilding silos toward a networked production model. Instead of each nation maintaining fully independent capacity for every class of vessel, production could be distributed across trusted partners with complementary capabilities. This increases aggregate output, reduces duplication, improves collective resilience, and complicates adversary targeting by dispersing industrial activity across multiple jurisdictions.

Governance and security considerations would require deliberate management. Export controls, intellectual property protection, classified systems handling, and national workshare expectations would need clear frameworks. These challenges are not unprecedented. Comparable mechanisms already exist in aerospace, munitions, and multinational defense programs. The Great Lakes environment provides a controlled geography in which such frameworks could be applied incrementally and tested at scale.

From an alliance perspective, the most significant implication is endurance. A binational production and sustainment model increases the ability of allied navies to replace losses, repair damage, and maintain operational tempo over extended periods. It transforms shipbuilding from a national bottleneck into a collective capability.

Analytically, the value of a Great Lakes shipyard is therefore not limited to its physical output. Its greatest contribution may be as a catalyst for binational and allied naval production integration, enabling a level of coordinated industrial capacity not previously realized within NATO. If approached deliberately, this model could redefine how surface combatants are built, sustained, and regenerated across allied fleets.

What a New Workforce Must Be Capable Of

The effectiveness of any new or modernized shipyard is ultimately determined by its workforce. Physical infrastructure establishes theoretical capacity ceilings, but skilled labor determines whether those ceilings can be reached reliably in practice. In shipbuilding, labor quality, experience, and organizational coherence are the primary drivers of schedule performance, cost control, and resilience under stress. Any effort to expand shipyard capacity must therefore treat workforce capability as a foundational requirement rather than a secondary consideration.

Workforce Capability to Deliver on Schedule and at Cost

First, the workforce must be sufficiently skilled and motivated to execute production predictably. On-time, on-cost delivery depends on disciplined workmanship, accurate planning, and consistent execution across thousands of interdependent tasks. Structural trades, electricians, pipefitters, combat system technicians, and test personnel must be capable of performing complex work correctly the first time. Errors that require rework consume labor without advancing progress and introduce cascading schedule impacts that are difficult to recover from in a tightly sequenced production environment.

Equally critical are the non-trade roles that enable production to function as a system. Planners, schedulers, material coordinators, and quality assurance personnel translate design intent into executable work packages and ensure that labor, material, and sequence remain aligned. When these functions are understaffed or under-experienced, even highly skilled trades struggle to maintain efficiency. Predictable performance therefore requires a balanced workforce in which production labor and production management mature together rather than independently.

Motivation directly influences both cost and schedule outcomes. A workforce that understands mission priorities, operates under clear expectations, and is rewarded for meeting them is more likely to sustain productivity across long production cycles. Conversely, environments characterized by chronic rework, unclear direction, or reactive management practices experience higher attrition and declining efficiency, further compounding cost growth and delay.

Workforce Resilience Under Unforeseen Stress

Second, the workforce must be resilient enough to absorb unforeseen problems while continuing to function with minimal schedule slippage. Shipbuilding does not occur under static conditions. Design changes, material delays, emergent repair work, and external disruptions are unavoidable. A resilient workforce is one that can adapt to these disruptions without losing cohesion, productivity, or quality discipline.

This resilience is built through depth of experience and cross-functional understanding. Workers who have encountered a range of problems are better able to diagnose issues quickly and implement effective solutions. Teams with overlapping skill sets can reallocate labor when bottlenecks arise. Supervisors with operational awareness can resequence work intelligently rather than defaulting to delay or work stoppage.

Such resilience cannot be improvised during crisis. It emerges from stable employment, repeatable work, and sustained exposure to complex projects over time. High turnover undermines resilience by stripping organizations of institutional memory and forcing constant retraining. In contrast, a workforce that remains intact across multiple production cycles develops the adaptive capacity needed to maintain output when conditions deviate from plan.

Workforce Continuity and Knowledge Transfer

Third, the workforce must be capable of sustaining itself over time through deliberate transfer of experience and skills. Shipbuilding is a learned profession. Much of its most critical knowledge is tacit, residing in judgment developed through practice rather than formal documentation. Without intentional mechanisms to pass this knowledge forward, capability erodes even when headcount remains constant.

Effective knowledge transfer requires structured apprenticeship and mentoring pathways that pair less experienced workers with seasoned personnel. It also requires sufficient production tempo to ensure that skills are exercised regularly rather than atrophying between projects. When production becomes episodic or unstable, learning cycles lengthen and proficiency declines across the workforce.

Leadership continuity is equally important. Experienced foremen, planners, and engineers provide the connective tissue between generations of workers and between design intent and execution. Their departure without deliberate replacement creates gaps that cannot be quickly filled. Workforce planning must therefore account not only for trade skills, but for the retention and development of leadership at every level of the organization.

From a strategic perspective, workforce continuity is inseparable from industrial endurance. A shipyard that cannot retain and regenerate its own expertise will experience declining performance over time, regardless of infrastructure investment. Conversely, a workforce that is skilled, resilient, and self-sustaining becomes a force multiplier, enabling consistent output, faster recovery from disruption, and long-term cost control.

In sum, a new or modernized shipyard requires more than additional labor. It requires a workforce capable of executing predictably, adapting under stress, and transmitting hard-earned expertise across generations. Without these attributes, expanded capacity will remain nominal rather than effective, and industrial constraints will continue to limit fleet endurance.

How Do We Keep the Workforce Motivated and All In

Motivation and retention are decisive factors in industrial performance. Shipbuilding is demanding work conducted over long timelines, with high physical, cognitive, and safety demands. A workforce that feels exposed to schedule pressure, personal risk, or arbitrary cost cutting will not deliver sustained performance. As a result, motivation must be designed into the operating model of the yard rather than addressed episodically through reactive incentives.

The proposed approach establishes a protected workforce and capability program tied directly to annual shipbuilding value. This allocation is additive and insulated from normal cost recovery pressures, ensuring that investment in people, safety, and continuity is not eroded during periods of schedule stress. The structure treats workforce stability as a standing industrial capability rather than a discretionary expense.

The following programs are additive costs per build. In no way should budget be cannibalized thereby reducing quality or safety

Performance and Delivery Incentive Program

The performance incentive component is designed to reinforce collective responsibility for on-time, on-cost delivery while still recognizing exceptional execution. The majority of incentives are distributed broadly to avoid zero-sum competition, reinforcing the principle that shipbuilding success is a team outcome. A smaller portion is reserved for high-performing teams and targeted intervention where extraordinary effort prevents cascading delay.

This structure aligns motivation with validated outcomes rather than schedule shortcuts. Incentives are contingent on safety and quality verification, ensuring that productivity gains do not come at the expense of workmanship or compliance.

Injury, Disability, and Family Support Program

Shipbuilding carries inherent risk. The injury and family support program reduces the personal and financial exposure faced by workers and their families in the event of injury, disability, or death. By guaranteeing family care and support through a protected mechanism, the program removes a significant source of anxiety that contributes to burnout and attrition.

From an industrial perspective, this stability improves retention, reduces absenteeism, and preserves team cohesion during disruptions. Workers are more willing to remain engaged during high-demand periods when they trust that the system will protect them and their families.

Immigration, Training, and Workforce Expansion Program

Sustained capacity growth requires access to skilled labor beyond local pipelines. The immigration and training initiative is structured to attract experienced tradespeople while simultaneously building domestic capability. Relocation and citizenship support lower barriers to entry, while service commitments ensure that investment in onboarding and training produces long-term returns.

The program also links tenure to education and certification opportunities. By tying continued service to paid education, the yard aligns individual advancement with organizational stability. Skills are deepened rather than churned, and workforce expansion occurs without degrading quality.

Mastery Titles and Technical Authority Program

Shipbuilding quality depends on clear technical ownership. The mastery titles program formally recognizes expert practitioners as custodians of standards within the yard. These individuals hold defined authority over workmanship, mentor developing workers, and serve as reference points during complex or disrupted work.

By institutionalizing expertise, the program reduces reliance on informal knowledge networks and improves consistency across hulls. It also provides a visible career apex for skilled trades, reinforcing retention among high performers.

Retention and Multi-Hull Continuity Program

Experience gained across multiple hulls is one of the most valuable assets in shipbuilding. The retention program explicitly rewards sustained participation across successive builds, reinforcing knowledge continuity and reducing learning curve resets.

This approach discourages workforce churn between hulls and preserves institutional memory. Over time, it lowers rework rates, improves schedule predictability, and strengthens the yard's ability to respond to unforeseen challenges.

Schedule Recovery and Crisis Response Program

Unplanned disruption is inevitable. The schedule recovery program provides a controlled mechanism to recognize extraordinary effort during genuine crisis events without normalizing emergency behavior. Funds are released only after safety and quality validation and are explicitly event-driven rather than expected.

This structure preserves discipline. It enables rapid recovery when required while preventing routine reliance on crisis incentives to mask systemic issues.

Innovation and Process Improvement Program

Continuous improvement is essential in a high-throughput yard. The innovation program rewards workforce-driven improvements in tooling, process, and safety. Recognition and compensation are tied to validated gains rather than speculative ideas, and intellectual property considerations are managed through a formal review process.

This encourages bottom-up problem solving while protecting the yard from uncontrolled change or fragmentation of standards.

Family Integration and Stability Program

Retention is strongly influenced by factors outside the workplace. The family integration program addresses housing stability, childcare access, and relocation support, particularly for skilled workers moving into the region. By reducing non-work stressors, the program improves attendance, morale, and long-term commitment.

For immigrant and relocated workers, structured integration support accelerates stabilization and productivity.

Retirement Bridging and Senior Mentorship Program

Loss of experienced personnel represents a critical risk. The retirement bridging program allows senior workers to transition gradually into reduced-hours, mentorship, and instructional roles. This preserves access to hard-earned knowledge while providing dignified and predictable exits from full-time production work.

The result is smoother knowledge transfer, stronger training outcomes, and reduced capability gaps during generational turnover.

Pride, Legacy, and Recognition Program

Finally, motivation is reinforced through visible connection to outcomes. Formal recognition of workforce contributions through hull registries, launch participation, and ship history documentation strengthens identity and pride. Workers are reminded that their effort produces tangible national assets, not abstract metrics.

This sense of legacy supports long-term engagement and reinforces the mission relevance of the work.

Program Effectiveness Summary

Taken together, these programs convert workforce funding from a reactive expense into a managed industrial capability. They stabilize labor supply, preserve expertise, and align individual motivation with quality, safety, and schedule discipline. By insulating workforce investment from short-term pressures, the structure improves predictability, reduces attrition, and strengthens the yard's ability to perform under stress.

Motivation becomes a structural feature of the shipyard rather than a temporary response to crisis. This is essential for sustaining industrial performance across multiple hulls, extended timelines, and the disruptions inherent in both peacetime and wartime operations.

Closing

Naval power is not measured solely by the number of ships in commission or the sophistication of their sensors and weapons. It is measured by endurance. A fleet that cannot be repaired, regenerated, and sustained under pressure is a fleet that cannot prevail in a prolonged conflict, regardless of how capable it appears on paper.

The United States has reached a point where fleet ambition has outpaced industrial capacity. This is not the result of negligence or lack of effort, but of decades of optimization for peacetime efficiency rather than wartime resilience. The consequences of that imbalance will not reveal themselves in budget hearings or acquisition milestones. They will reveal themselves when damaged ships wait for dock space, when skilled labor is unavailable, and when commanders are forced to conserve forces because regeneration timelines are uncertain.

A new, purpose-built surface combatant shipyard represents more than additional capacity. It represents a restoration of strategic margin. Coupled with a deliberate workforce strategy, it would provide the Navy with confidence that losses can be absorbed, damage can be repaired, and pressure can be sustained. It would align fleet design with industrial reality and convert shipbuilding from a constraint into an enabler of combat power.

The Constitution charges the nation with the responsibility to build and maintain a navy. Deterrence depends not only on the ability to strike, but on the demonstrated capacity to endure. A fleet intended to fight and win a modern maritime war must be supported by an industrial base capable of sustaining operations, repairing damage, and regenerating combat power. That industrial foundation is a strategic requirement, not a discretionary investment.