

# Resilient Shipyards, Ready Fleets: Strengthening U.S. and Allied Maritime Self-Reliance with Proven Shiplift & Transfer Systems

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## Summary

U.S. and allied fleets face contested sea lanes, gray-zone activity, and unpredictable global conditions. Counting hulls is not enough. The ability to repair, refit, and relaunch ships on a steady cadence now defines credible power.

Shipyards are strategic assets. Legacy approaches — exposed floating drydocks and single-vessel docks — create chokepoints and weather risk. In contrast, fixed shiplifts with rail transfer convert limited quay wall into multiple land-side work positions, resulting in shorter cycles, higher operational availability, and real surge capacity.

Shiplift and transfer technologies make this shift practical. The chain-jack design lifts evenly at every point with precise, synchronized motion and is fixed to the shore rather than floating. Transfer rails move vessels both laterally and longitudinally to planned work bays, freeing the lift quickly. The result is predictable throughput that helps partners become more self-reliant and resilient.

**Funding pathway.** NATO allies endorsed a **5% of GDP for defense by 2035** framework at the 2025 Hague Summit, with **up to 1.5%** for dual-use infrastructure, which could include ports, shipyards, shiplifts, and land-side transfer systems. Aligning projects to this lane can unlock funding while delivering civilian co-benefits.

**Bottom line.** Shiplift and transfer technologies are proven tools for strengthening yard operations and fleet readiness. The goal is to help partners become more self-reliant and resilient amid growing maritime challenges, directly underpinning defense strength. Strong maritime infrastructure should not be a by-product of shipbuilding and force structure alone: It should be a deliberate objective of national strategy.

**Policy levers to achieve it.** Governments should embed defense in early-stage planning for major infrastructure projects, establish technical and security standards that can be incorporated into commercial builds, negotiate long-term access agreements with owners and operators, and pay for defense-specific enhancements that commercial customers otherwise would not need. Another effective tool is **loan guarantees** to crowd-in private investment for dual-use projects, alongside grants or usage-charge agreements where appropriate.

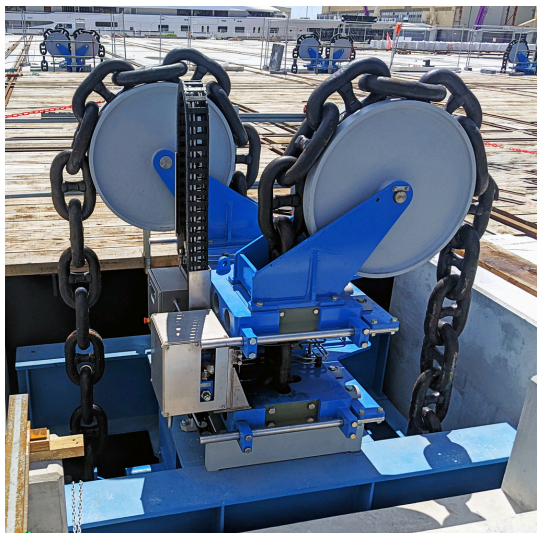
## Introduction

**Purpose and audience.** This paper makes the case that resilient shipyard infrastructure underpins fleet readiness for the United States and its allies. It is written primarily for government decision-makers and shipyard leaders, accessible to non-technical readers, and structured so acquisition professionals and engineers can quickly extract the strategic and operational implications.

**Scope.** We examine vulnerabilities in traditional infrastructure, outline how shiplift and transfer systems change the yard's critical path, and describe the readiness effects leaders can budget for and measure. This is not a design manual; it is a readiness framework that can be adapted to local codes, conditions, and mission sets.

## Key terms (at-a-glance):

- **Chain-jack:** Hydraulic mechanism that advances a closed-loop chain in short, synchronized strokes; provides precise, predictable motion; and keeps the load evenly shared. Controls [programmable logic controllers (PLCs)/sensors] are present but not dependent on large arrays of high-power variable frequency drives (VFDs).



- **Compensated Gross Tonnage (CGT):** An adjusted form of gross tonnage that applies coefficients for ship type and complexity. Used as a proxy for shipbuilding workload and yard capacity in commercial output comparisons (not the same as GT, and it does not fully capture naval work).
- **Distributed maintenance:** Parallel, land-side work bays that replace single-vessel chokepoints and create a predictable maintenance cadence.
- **Gray-zone pressures:** Coercive actions below open armed conflict, ambiguous, incremental, and cross-domain, used to delay, distract, or degrade allied operations (e.g., militia swarming, regulatory harassment, GPS/AIS interference, or cyber activity against ports and shipyards).
- **Mission assurance:** The ability to continue essential functions under stress, including weather, grid variability, or supply disruption.
- **Operational Availability (Ao):** Uptime / (uptime + downtime); a standard sustainment measure of how much of the fleet is mission-capable.
- **Shiplift:** A large, waterfront elevator that lifts a vessel clear of the water so it can be moved ashore by any of several types of transfer systems for maintenance and later relaunched quickly to achieve its operational mission.
- **Surge capacity:** The ability to service multiple hulls rapidly under abnormal demand (post-storm, post-damage, or heightened alert).
- **Transfer system:** Mobile cradles and transporters (e.g., rail with bogie cars or self-propelled modular transporters) that move vessels from the lift to land-side work bays, freeing the lift for the next hull.



### Shipyards as Critical Defense Assets

Fleets prevail by being sustained. Shipyards convert force structure into force projection by repairing, refitting, and redeploying vessels under pressure. They give navies the strategic depth to absorb damage and surge.

History bears this out. At Pearl Harbor, the survival of the drydocks enabled rapid salvage and repair that preserved combat power in 1942. Britain's dispersed dockyards sustained tempo despite bombing. The lesson is consistent: infrastructure resiliency sustains options.

Adversaries act accordingly, expanding industrial depth and dispersing risk. Many allied facilities still rely on storm-exposed or capacity-limited infrastructure. **Self-reliance and resilience are readiness.**

*Naval power rides on ships; deterrence rides on the yards that keep them mission-capable.*

### Fragilities in Today's Infrastructure

Against that backdrop, many U.S. and allied facilities still rely on systems that are outdated, vulnerable, or poorly matched to modern requirements. These fragilities pose strategic risks as real as any shortfall in fleet numbers.

**Floating drydocks** remain particularly exposed. While versatile, they are vulnerable to storms, corrosion, and accidents (e.g., damage leading to sinking). When a floating dock is lost or taken offline, the repair capacity of an entire port can be disrupted. Their mobility — once considered an advantage — has become a liability in an era of more-frequent extreme weather and higher expectations of availability. Recent history underscores the point: The 2018 sinking of Russia's PD-50 drydock while holding the carrier *Admiral Kuznetsov* sidelined a key repair node and forced years of work-around repairs.

**Wire rope-based shiplifts** introduce a different challenge. Wire rope stretches and fatigues under heavy load, requiring constant monitoring, frequent replacement, and disciplined maintenance procedures. Failures will occur over time and can be sudden and severe, halting operations until replacements are sourced and installed. Many rope systems also rely on proprietary control electronics and parts that are costly, subject to obsolescence, and not always available on the timelines required for defense readiness. The result can be infrastructure that is more fragile than resilient.

**Drydock bottlenecks** further limit readiness. Traditional docks can service only one vessel at a time (or, perhaps, two smaller vessels), creating single-point chokeholds. In a surge scenario after combat damage or heightened readiness alerts, this constraint directly reduces fleet regeneration speed and, by extension, deterrent power.

Strategically, adversaries are moving in the opposite direction. China has expanded graving-dock capacity along its coasts, creating distributed redundancy. Russia has rebuilt key yards after high-profile losses to ensure Arctic and Pacific operations can continue. By contrast, many U.S. and allied facilities remain vulnerable to single points of failure and rely on systems that cannot guarantee throughput under stress.

The lesson is clear: Traditional approaches no longer provide the resiliency required for modern naval operations. Infrastructure fragility translates directly into operational risk, undermining the self-reliance and resiliency of U.S. and allied maritime forces.

### Shiplift Systems: Proven and Fielded Internationally

**What it is and why it matters.** A shiplift is a large waterfront elevator. A vessel floats over a submerged platform; the platform rises, lifting the vessel to shore level; and the vessel is transferred ashore. This converts limited quay wall into multiple land-side work positions, turning a bottleneck into flow.

**How it works.** Shiplifts (marketed as OmniLift®) use chain-jacks that advance a closed-loop chain in short, synchronized strokes. The lift moves precisely and evenly without being limited by wire rope stretch and without requiring large arrays of equalizing drives. These systems are in service with allied shipyards today, and the design approach is engineered to meet or exceed U.S. codes and standards.

### Defense-relevant effects:

- **Resiliency under stress.** A shiplift is a fixed, shore-anchored system — built into the pier and ground — engineered to local environmental and seismic criteria. It does not carry the storm-exposure profile of floating assets.
- **Self-reliant sustainment.** The chain-jack approach centers on robust mechanicals and hydraulics with predictable service intervals and long component life. Controls are straightforward, do not require extensive training, and are designed to avoid rapid obsolescence, reducing sustainment friction in contested logistics conditions.
- **Throughput and tempo.** Stable lift geometry and precise synchronization enable repeatable, parallel maintenance when paired with transfer systems. This results in a larger “ready bench,” faster turnarounds, and increased surge capacity with lower capital expenditures (CAPEX) and operating expenditures (OPEX) without lengthening the waterfront. The transfer method (rail or self-propelled) is selected to fit site geometry and mission.
- **Life cycle discipline.** Decades of chain-jack and heavy-lift experience inform component choices that remain supportable over time. Fewer proprietary black-box dependencies mean steadier sparing plans and reduced schedule risk from part lead times.
- **Safety and continuity.** Even load sharing and short stroke increments temper shock events and preserve control margins. Procedures are clear; the design has an unbroken in-service safety record, which is key to continuity of operations under time pressure.

### Transfer Technologies: Multiplying Capacity Beyond the Lift

**What it is:** After lifting, the vessel sets onto a mobile cradle on rails. Vessels move laterally and/or longitudinally to assigned work bays. The lift is freed quickly, and maintenance proceeds in parallel.

### Why it matters for defense:

- **Parallelization.** Distributed maintenance replaces single-vessel chokepoints; availability rises on a cadence, not a queue.
- **Surge without new basins.** Triage and stage several hulls at once after storms, damage, or alerts.

### Operational Overview:

1. Align and float-on.
2. Lift to transfer height.
3. Set onto the mobile cradle; verify supports.
4. Controlled roll to the assigned bay via rails or self-propelled modular transporter (SPMT).
5. Connect services and execute the work package.
6. Reverse to relaunch.

**Risk reduction.** Removes the single-vessel constraint, reduces weather exposure versus floating assets, and distributes maintenance so no single unplanned event or technical incident on any given Maintenance, Repair, and Overhaul (MRO) project idles the yard.

- **MRO efficiency.** MRO can be done much more efficiently on a hard stand free of side walls. Greater equipment and personnel access allows more work to be done simultaneously, and cleanup of excess materials and equipment can be taken off the critical path after the vessel has gone back to sea.

### Infrastructure and Strategy: Why This Matters Now

The security environment is shifting faster than shipbuilding cycles. Great-power competition, contested logistics, and dynamic operating environments are converging on the same pressure point: **the ability to regenerate combat power at the waterfront**. In this context, shipyards and ports are not back-office functions; they are instruments of maritime posture for the United States and its allies.

**Deterrence depends on availability, not just inventory.** Force structure communicates intent, but **readiness generation** communicates credibility. If hulls cannot be serviced, staged, and relaunched on cadence, operational tempo stalls and deterrent value erodes. Infrastructure that turns maintenance into a predictable rhythm — lift, roll, work, relaunch — directly raises the number that matters in a crisis: **ships ready for tasking today, tomorrow, and on the timeline the mission demands.**

**In contested logistics, self-reliance becomes essential.** In a world of strained supply chains and potential interdiction, reliance on fragile or bespoke systems is a strategic liability. Fixed, civil-anchored lift and transfer capabilities with **predictable service intervals** and long-life mechanical components reduce exposure to obsolescence and parts churn. That simplification is not just an engineering choice: It is a **risk-management decision** for wartime sustainment.

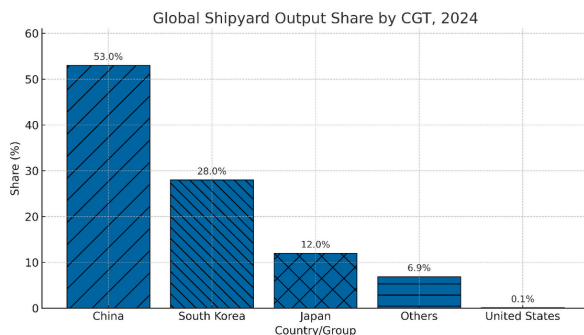
**Disruptive weather events are an operational variable.** Extreme weather is now a planning assumption, not an exception. Floating assets carry exposure profiles that can sideline entire yards at the wrong moment. Infrastructure engineered to local environmental and seismic criteria and designed for controlled motions and predictable load paths, supports **mission assurance** when storms, surge, or grid variability complicate operations.

**Adversaries are building industrial depth.** Competitors treat shipyards as instruments of national power, expanding capacity and dispersing risk across multiple sites. The allied answer is not merely to buy more ships, but to match industrial resilience: distributed maintenance, scalable transfer capacity, and yards that can surge without waiting on new basins or long civil works.

### Capacity snapshot (accurate as of 2023-2025)

*CGT (compensated gross tonnage) adjusts GT by ship type/complexity to approximate shipbuilding workload; it's the standard yard-capacity proxy for commercial output. Naval programs are not fully reflected.*

- **Global shipyard output share (CGT):**
  - **2023:** China ~50%, South Korea ~26%, Japan ~14%, United States ~0.2% (commercial est.).
  - **2024:** China ~53% (+3 pts YoY), South Korea ~28% (+2 pts YoY), Japan ~12% (-2 pts YoY), United States ~0.1-0.2% (about flat) (commercial).
- **Drydocks:** China ~140; U.S. Navy public yards 18; certified private docks also exist.
- **Relative shipbuilding capacity:** China's shipbuilding capacity is roughly 230 times that of the United States.



**Figure 1. Global shipyard output share by CGT, 2024**

*A 53/28/12 world demands allied throughput ashore. As of 2024, the United States sat at ~0.1% of global CGT (pulled from "Others" for clarity), underscoring the need to grow repair capacity. Align projects to NATO's dual-use 1.5% funding lane to accelerate shiplifts, transfer grids, and real readiness gains. Source: Clarksons Research via MarineLink*

**Budgets reward throughput, not rhetoric.** Defense leaders face a balancing act: readiness targets, fiscal limits, and workforce constraints. Infrastructure that multiplies bays, standardizes procedures, and shortens cycle time yields measurable outputs — higher Ao, shorter turnaround, steadier schedules — that withstand audit and justify investment. In strategic terms: more deterrence per dollar.

**Policy alignment: NATO's 5% / 1.5% framework.** At the 2025 Hague Summit, allies endorsed a benchmark to reach 5% of GDP by 2035: 3.5% for core defense and up to 1.5% for broader defense- and security-related investments, including dual-use infrastructure (e.g., roads, bridges, ports, cyber, and critical installations). Maritime infrastructure — graving docks, floating docks, shiplifts, and land-side transfer systems — is inherently dual-use and should be evaluated within this 1.5% line. For many allies, aligning shipyard upgrades to this category can unlock funding pathways while delivering civilian co-benefits (commercial ship repair, disaster response, industrial jobs).

**Allied interoperability starts at the quay wall.** Interoperable sustainment — the ability for partners to stage and service classes of vessels in familiar workflows — raises combined readiness without imposing identical designs. Modular lift and transfer architectures support coalition flexibility while respecting national standards and local conditions.

**The strategic choice.** Modern fleets will be judged by how quickly they return to tasking after maintenance, damage, or surge alerts. Treating shipyards as deliberate instruments of deterrence, not industrial afterthoughts, aligns infrastructure with strategy. That is the case for resilient shiplift and transfer capability: It converts finite waterfront into a repeatable force-generation system.

**Implementation note.** To unlock dual-use yard capacity quickly and credibly, engage Defense early in commercial project planning, set defense-grade standards at concept stage, negotiate access terms up front, and use financing tools, such as loan guarantees or usage-charge agreements, to support features that commercial users do not require.

### Build the Yard, Build Deterrence: Action Plan

Readiness is generated at the quay wall. U.S. and allied fleets will be judged less by hull counts than by how quickly they return to tasking after maintenance, damage, or surge alerts. That demands shipyards designed as readiness engines.

Modernizing shipyards and ports is not a singular project — it's a continuum of readiness. Defense leaders can act now to translate strategy into measurable outcomes:

- **Align investments with policy frameworks:** Map proposals to allied dual-use infrastructure initiatives and emphasize civilian co-benefits in each business case.
- **Quantify readiness gaps:** Conduct readiness workshops to assess constraints, identify achievable uptime improvements, and align operational concepts with mission needs.
- **Plan for feasibility and sustainment:** Commission site and civil works assessments early, integrating life-cycle, training, and sustainment considerations from the outset.
- **Design for scalability:** Phase infrastructure growth to enable multi-position operations and faster throughput as mission requirements evolve.
- **Tie outcomes to accountability:** Anchor performance metrics — throughput, turnaround, availability — to defense-industrial-base objectives and policy goals.

Collectively, these actions form a roadmap for allied shipyards and ports to strengthen industrial resilience and deliver sustained maritime readiness.