Choosing the Right Dry Dock Solution for Naval & Military Shipyards

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Dry Dock vs the OmniLift® Shiplift: A Practical Comparison For Modern Maintenance Repair and Overhaul (MRO) operations

Selecting a docking solution is one of the most consequential infrastructure decisions a naval or military shipyard can make. Docking facilities directly influence fleet availability and readiness, operational risk, environmental exposure, long-term costs, and the day-to-day realities faced by dockmasters and shipyard teams.

While legacy dry docks remain widely used, evolving operational demands, risk profiles, and lifecycle considerations are leading many organizations to re-examine whether traditional approaches are the only or best option.

This educational guide is intended to help naval and military shipyard decision-makers understand how different docking approaches compare, and what factors matter most when evaluating long-term shipyard capability.

The Legacy Dry Dock Landscape

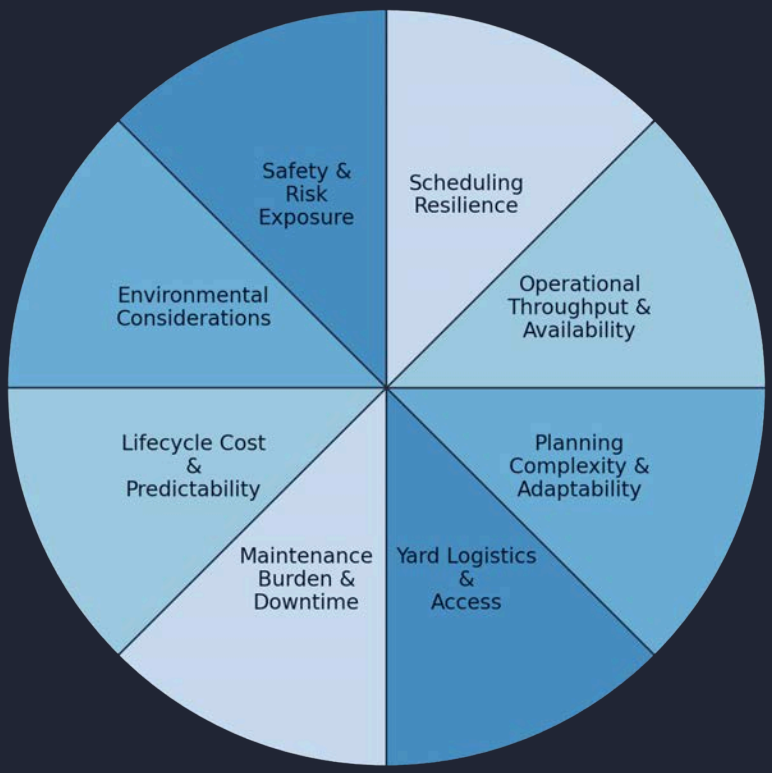
Dry docks are critical for ship maintenance, repair, and overhaul (MRO). This has meant relying on either floating dry docks to lift vessels clear of the water or graving docks with a drained basin to complete the work.

Both approaches are well understood, broadly deployed, and deeply integrated into shipyard operations around the world. At the same time, both come with structural, operational, and risk considerations that increasingly shape how shipyards plan for the future.

Key Decision Criteria for Modern Naval Shipyards

Before comparing specific systems, it is useful to establish the criteria that typically drive docking infrastructure decisions:

Docking Infrastructure Decision Framework



Floating Dry Docks

How Floating Dry Docks Work
Floating drydocks are buoyant structures that lift other vessels clear of the water through control of ballast water.

Strategic Advantages of Floating Dry Docks
Floating dry docks are widely used and familiar to many shipyards and dockmasters. Their operating principles are well understood, and they remain a common choice in locations where permanent infrastructure is impractical. Floating drydocks are also assets that can be moved or sold providing collateral for financing.

Limitations and Risk Considerations
Floating dry docks are inherently constrained in ways that affect throughput, scheduling, safety, and environmental performance.

Limitations of Floating Dry Docks

Another downside is lack of access for personnel and equipment because of limitations set by the wing walls.

All of these limitations become more pronounced as shipyard demand increases or schedules tighten.

According to Kaup, Łozowicka, and Blatnický (2018), docking operations conducted using floating docks and graving docks have experienced technical failures, human error, environmental impacts, and financial losses, including in facilities operating under established procedures.

When Floating Dry Docks Are Typically Selected
Floating dry docks are often selected where geographic constraints limit fixed infrastructure or where existing operational familiarity is prioritized.

Graving Docks

How Graving Docks Work
Graving docks are fixed basins constructed into the ground. Vessels enter the dock, gates are sealed, and water is pumped out to expose the hull.

Strategic Advantages of Graving Docks
Graving docks provide a stable, enclosed environment and have historically supported large vessels and complex maintenance programs. Because they are constructed as fixed basins, graving docks can be built to virtually any length, allowing them to accommodate very large ship classes where floating dry docks or shiplift systems may become increasingly challenging to scale economically.

In locations with favorable subsurface conditions, graving docks can offer a durable, long-term solution for high-capacity MRO operations. When geology, vessel requirements, and long-term operational plans align, graving docks may provide a viable approach for servicing the largest vessels in a fleet.

Limitations and Risk Considerations
Graving docks introduce several structural and site-dependent constraints that influence long-term shipyard planning and operations.

Limitations of Graving Docks

AAnother downside is lack of access for personnel and equipment because of the constrained pit. These constraints shape not only cost and schedule, but how shipyards scale, adapt, and manage risk over time.

When Graving Docks Are Typically Selected
Graving docks are often chosen where long-term permanence is required, heavy load concentrations are anticipated, and where site conditions support large, fixed infrastructure investments. Graving docks are also often chosen for the largest classes of vessels, such as aircraft carriers, Post Panamax carriers, and large cruise ships.

Reframing the Question: Is a Dry Dock the Only Option?

FFor many shipyards, the question is no longer whether dry docks work, but whether their inherent constraints align with modern operational and lifecycle requirements.

Throughput limitations, scheduling interdependence, environmental exposure, and long-term cost predictability are driving interest in alternative approaches to docking, berthing, and vessel transfer.

Introducing a Different Approach to Docking and Transfer

Shiplift and transfer systems represent a different model, one that separates vessel berthing from repair timelines and emphasizes flexibility, redundancy, and land-based maintenance workflows.

The OmniLift as a Strategic Alternative to Traditional Dry Docks

How the OmniLift® Shiplift Works
The OmniLift® shiplift is a permanent lifting and transfer system that raises vessels and moves them to onshore berths, where maintenance and repair activities take place on hard stand areas in the shipyard.

How the OmniLift Aligns with Modern Naval Requirements
Based on internal operational analysis, the OmniLift system offers several performance and planning advantages for modern shipyards.

An OmniLift is unique among the three infrastructure choices in that it does not require specialized dockmaster training to operate. All operations are simply a push of a button and operators can be trained in a matter of a few days.

Operational Advantages of the OmniLift® System

Low Cost per Vessel

Lowest berthing and launching cost per vessel

Lifecycle Efficiency

Minimum lifecycle cost over system lifespan

Scalable Flexibility

Capacity driven by the number of onshore berths

Scheduling Independence

Delays on one project do not affect others

Optimized Yard Access

Improved logistics for vehicles, equipment, and materials

No Mooring Required

No mooring required during transfer operations

Operational Simplicity

Simple control systems without specialized skill requirements

Comparative Decision Framework

When comparing the OmniLift® system to floating dry docks, key operational differences emerge in how capacity, risk, and environmental exposure are managed.

OmniLift® vs Floating Dry Docks: Operational Comparison

Floating Dry Docks	OmniLift®
⚠ Concentrates capacity, risk, and schedules into a single asset	✓ Distributes work across multiple onshore berths
⚠ Sensitive to weather and stability variables	✓ Reduces weather and stability exposure by operating primarily on land
⚠ Requires ballasting operations, adding time and environmel risk from contaminated water	✓ Uses a steel platform and hydraulic chain jacks; no ballasting and no waterway contamination
Lift/Lower Cycle Time: 4 to 14 hours	**Lift/Lower Cycle Time:** 1 to 2 hours

The OmniLift vs Graving Docks

While the OmniLift is also permanent infrastructure, it avoids the constraints of a fixed graving basin and supports more flexible, parallel workflows through onshore berthing.

From a cost perspective, constructing a new graving dock typically requires capital investment on the order of billions of dollars, driven primarily by large-scale civil works. By contrast, an OmniLift system with associated civil works is generally on the order of millions, with the majority of cost tied to site preparation and civil construction rather than the lifting equipment itself.

This difference in scale and cost structure can significantly influence how shipyards approach long-term planning, modernization, and reuse of existing infrastructure. Beyond capital considerations, however, the two approaches also differ in how they affect daily operations and maintenance tempo.

Operational tempo is another meaningful distinction between the two approaches.

Lift and lower operations for graving docks generally occur on a time scale similar to floating dry docks, with cycle times measured in many hours and closely tied to pumping, environmental conditions, and operational sequencing.

By contrast, shiplift systems such as the OmniLift operate on significantly shorter lift and lower cycles, enabling substantially higher daily throughput. In practice, shiplift operators can perform multiple lift cycles per day, a tempo that would not be achievable with either floating dry docks or graving docks.

This difference in cycle time and repeatability can materially affect berth turnover, maintenance capacity, and overall fleet availability.

Short-Term vs Long-Term Considerations

Initial Implementation Considerations
Upfront cost, site conditions, and integration with existing operations are often the primary short-term considerations.

Operational Lifecycle Implications
Over time, maintenance burden, downtime, and scheduling resilience increasingly shape total cost and effectiveness.

Flexibility for Future Fleet Evolution
Infrastructure that supports adaptability is better positioned to accommodate changing fleet requirements. Both the lifting capacity and the length of the OmniLift can be increased as the needs of the fleet change.

Environmental Considerations
Shiplifts enable vessels to be moved onto land for work, where paint, runoff, and other debris can be more responsibly managed than if in a graving dock.

Addressing Common Misconceptions About Dry Dock Alternatives

Docking decisions are fundamentally risk-management decisions. Familiar systems often feel safer because their variables are well understood, while new systems introduce uncertainty even when overall risk exposure is reduced.

Education, transparency, and operational familiarity play a critical role in technology adoption.

How Naval Decision-Makers Typically Evaluate the Right Solution

Effective docking infrastructure evaluations extend beyond engineering performance to encompass operational risk as a whole.

Docking Infrastructure as an Operational Risk Decision

Not just an engineering choice. A decision that shapes operational risk.

Learning More About the OmniLift

For organizations evaluating long-term shipyard infrastructure, learning more about alternative docking and transfer approaches can help determine alignment with mission requirements, risk tolerance, and operational goals.