THE BARDEX CHAIN JACK SHIPLIFT

Lifting shipyards to new heights

Need help relating system size to market potential, CAPEX, and OPEX?

Exploring the right questions when planning a new shiplift or a retrofit of a legacy wire rope system is essential to success.

But you don't have to answer them alone. Chances are you didn't get to where you are without a mentor – don't assume you'll arrive at the best solution for your goals without a trusted advisor using state-of-the-art data and tools.

Bardex.com | Bardex@Bardex.com

BARDEX CORPORATION

4,300T shiplift delivered in 2022, France

AT BARDEX, WE DON'T JUST LIFT SHIPS.

We lift communities and regional economies.

Need to increase your shipyard's capacity but not sure where to start? Taking the time at the very start of shiplift design to understand 6 core considerations of facility design will save you time, money, and avoid costly mistakes.

Geology – Controlling overall project costs begins with understanding local geology.

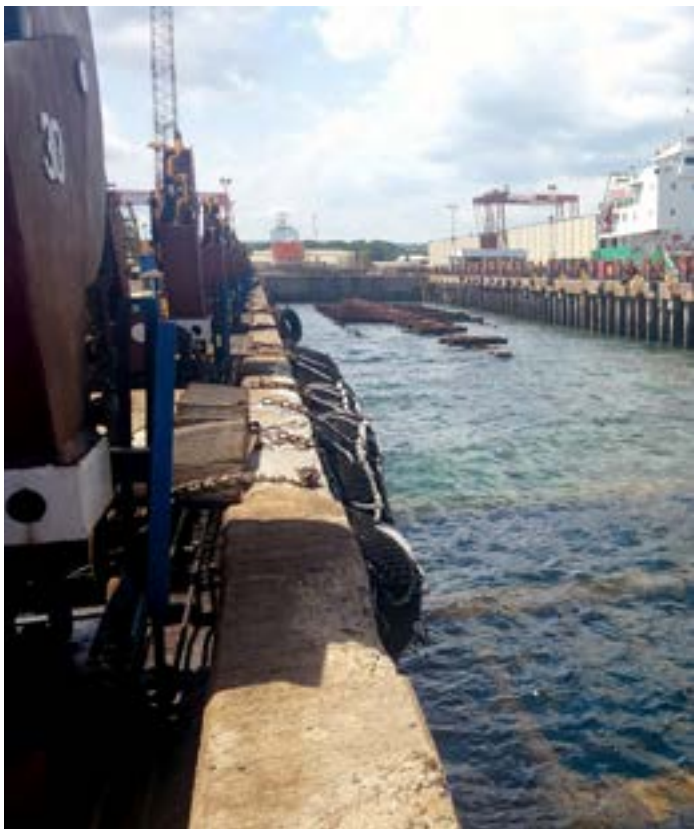
Geometry – Is this a new yard with more flexibility in building layout, or are there existing constraints when maneuvering ships to the work areas? Perhaps the channel access has features that affect the layout.

Target Market – What types of ships is this shiplift intended to lift?

Operational Objectives – Refit, inspection, or new builds? Maybe all the above. Will your region be experiencing an increase in demand to maintain vessels related to offshore wind? How about propulsion and emissions treatment system modifications necessary to meet new regulatory and sustainability requirements for vessels operating in your region?

EPC Plan – What resources are available in your region to support the implementation and future operations of your project?

Financial Plan – You know you need more capacity, but how do you prepare to present the best business case to management? Bardex will assist you with data analytics that provide insight into the regional demand for service.



12,000T shiplift delivered in 1982 and still in operation as of 2023, Philippines

QUALITY OVER QUANTITY

We don't claim to have built the most systems, but our safety record speaks volumes.

We are avid transparency supporters and look forward to honest conversations around our technology and safety track record.

Our equipment is scalable and features a compact footprint. These two features allow us to design a shiplift system that produces the lowest civil construction cost by reducing the number of piles and the width of the key sides supporting the shiplift. Civil construction cost drive the project budget, often exceeding the cost of the shiplift equipment by ratios of 5-to-1 or more.

Compared with other options, such as a floating dry dock, shiplifts allow repair yards to service many ships simultaneously by transferring them into the yard instead of just one occupying the dry dock.

Reduce Maintenance

Adhere to Lloyd's Code for Lifting Appliances in a Marine Environment for classification or certification while accessing:

- A simple design with fewer moving parts than wire rope systems.
- No excessive wear and tear due to fleet angle between wire rope drum and sheaves.
- No maintenance-prone items such as VFDs, gearboxes, brakes, bearings, sheaves, or wire ropes.

Enjoy the Benefits of Chain

- Superior corrosion resistance compared to wire ropes and sheaves submerged in sea water.
- Chains exhibit up to 15-year service life compared with a maximum 5-year life for wire ropes.

Protect the Environment

- Eliminate environmental pollution caused by submerging greased wire ropes and sheaves.

Achieve Accuracy Where It Matters Most

- Load measurement, display, and recording an accuracy of 0.5% of the lift capacity.
- Accurate position control and synchronization provide a perfectly level lift down to 1mm across the entire platform without operator intervention.

4,300T shiplift delivered in 2022, France

Need to follow other specifications in addition to the Lloyd's Code?

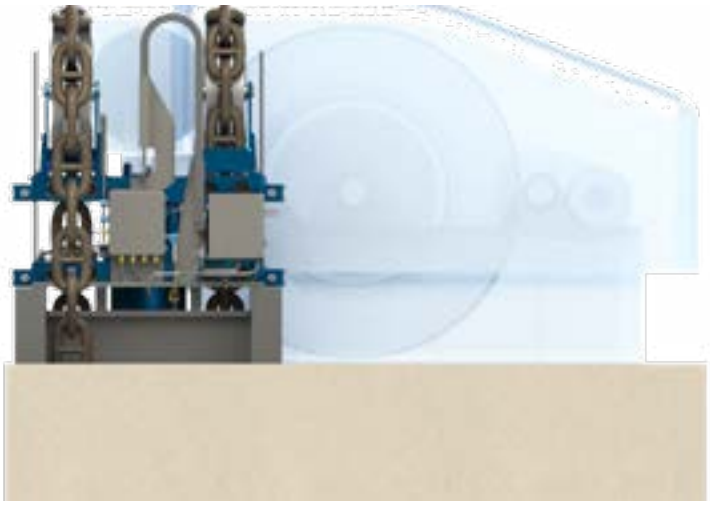
Our systems exceed the requirements set out by NAVSEA's Safety Certification Program for Drydocking Facilities and Shipbuilding Ways for U.S. Navy Ships (MIL-STD-1625D(SH)) and the Coast Guard's Surface Forces Logistics Center's (SFLC) Standard Specification 8634 – Drydocking. We are eager to explore any design. Whether it's the 12,000T shiplift and transfer system delivered in 1982 or the 4,300T delivered 40 years later, shipyards around the globe stake their reputation on ours.

IS YOUR LEGACY WIRE ROPE SYSTEM DRIVING COSTS UP?

What goes up must come down, and Bardex will work with you to forge a path forward.

Environment for classification or certification while accessing:

- Using the existing civil works with little to no modifications
- Reducing the quantity and size of piles under the shiplift piers by up to 33%
- Reducing concrete for pier construction by up to 50%
- Reducing pile cap thickness by up to 25%
- Increasing your market share and revenue potential resulting from adding up to 25% more lift capacity with the same number of lift stations
- 1/3 to 1/5 reduction in operating expenses compared to legacy wire rope systems
- Upgradeable after original duty life or when your yard outgrows its current needs, as some of our repeat customers have



Cement is responsible for ~8% of global carbon emissions every year. Using existing civil works or reducing the amount of concrete for pier construction will reduce the carbon intensity of your project.

Retrofitting a wire rope shiplift with a Bardex chain shiplift

WHAT ARE THE MOST EFFICIENT DIMENSIONS FOR A SHIPLIFT SYSTEM? STOP THROWING DARTS AT WHAT YOU THINK YOUR MARKET IS BY DEPLOYING PREDICTIVE INTELLIGENCE!

The Bardex difference is our approach in defining your shiplift parameters using **real-time data analytics**. An accurate understanding of your potential customer base, combined with any site-specific limitations such as channel depth, grants us the necessary insight to draft the optimal shiplift designed to maximize your ROI.

Designing a shiplift with the capacity for every ship in your area might capture 100% of *the* market, but still be suboptimal for your market. An outlier vessel may not be worth including in *your* target market if it translates to a longer time to recoup your investment *or* if the outlier vessel's expected remaining service life is short.

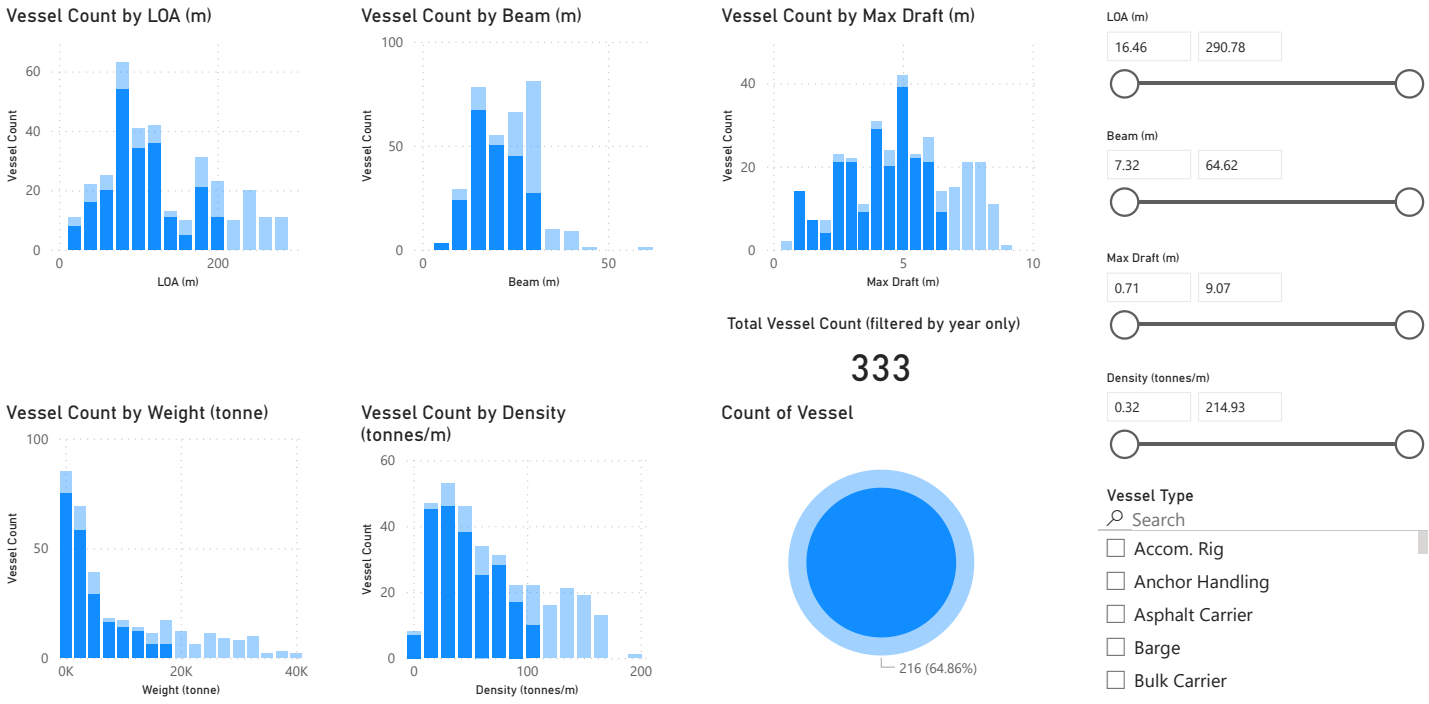
Maybe you know you need to increase your yard's capacity – you're the one to see it full every day - but you need to convince someone else to fund the expansion. Where do you start?

A data-driven economic case.

Hand them an evidence-based business case for investing in the shipyard's future, with optimized system dimensions, and an estimated time to break even on the capital expenditure. We'll be there to help you guide them from asking "How can we afford this?" to "How can we afford ***not*** to do this?"

Data-defined. Data-driven. No guesswork.
Bardex Predictive Intelligence.

Shiplift Sizing-Market Capture Tool



TOOLS TO HELP YOU CHOOSE THE OPTIMAL DESIGN FOR YOUR TARGET MARKET ANALYTICALLY.

THE OMNILIFT™

The OmniLift™ integrates three proven engineering technologies: shiplift chain jacks, the long span steel truss, and lift span bridges. Shiplift Chain Jacks, invented by Bardex in the 1960s, are intrinsically safe marine lifting devices scalable to immense capacities. The first long span steel truss bridge, Eads Bridge, was completed in St. Louis in 1874 and remains in use to this day. The first lift span bridge, the Hawthorne Bridge, was built in 1910 in Portland, Oregon.

No new technologies, analysis methods, or materials are required to achieve the supply chain improvements and social benefits proposed.

Unique to the Bardex system is the ability to directly lower the floater for wet tow and retrieve floaters back to dry land for major O&M and/or extending the life of the FOSW platforms. There is no other solution out there that can do this.

This breakthrough will improve the supply chain process and streamline the assembly process for serial production by:

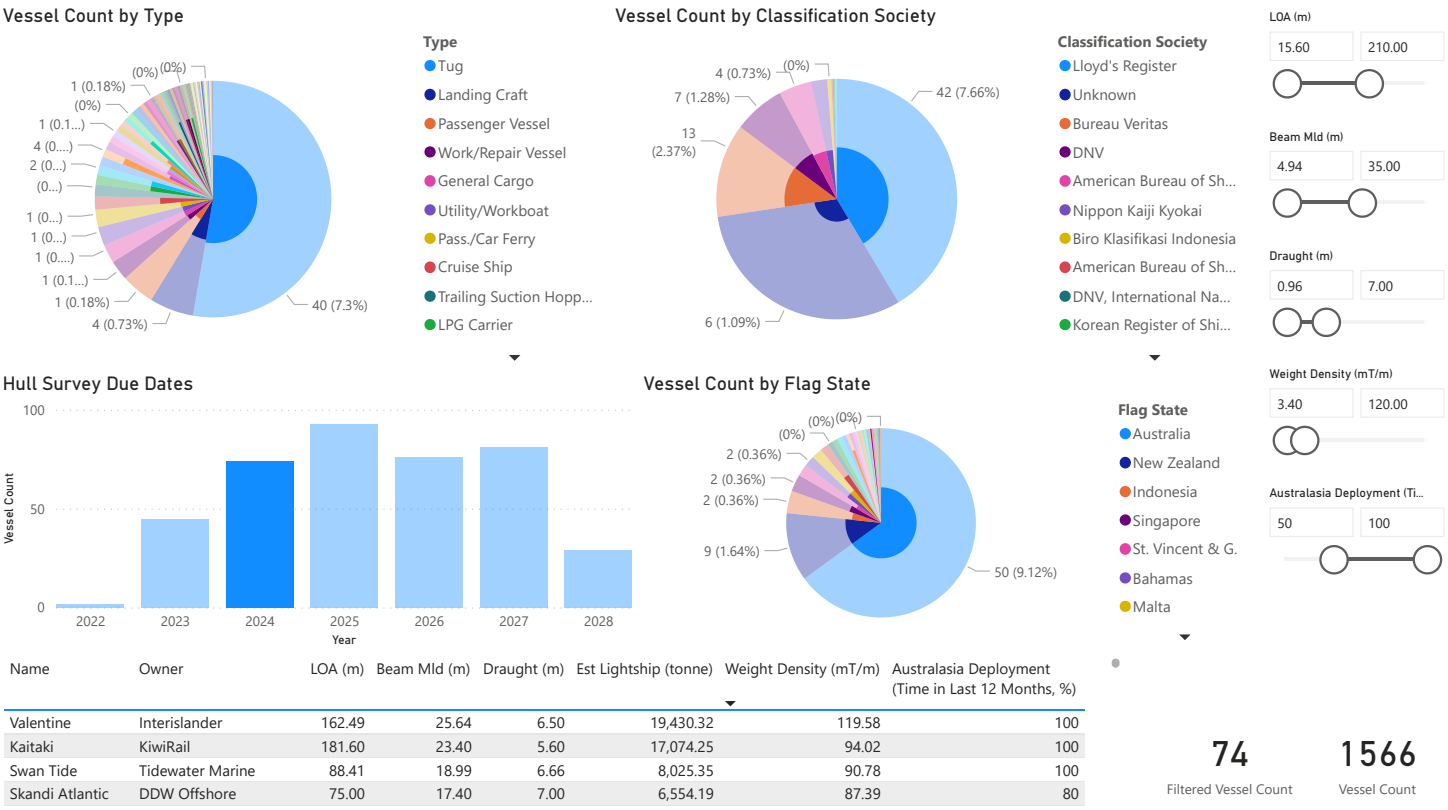
- Providing an integrated extension to the existing quayside and adding an additional assembly area. The assembly of large FOSW platforms, like semis, TLPs, etc. can take place on a stable surface, and the assembled systems can be directly lowered for wet tow - reducing the health and safety risks compared to floating methods.
- Utilizing the OmniLift™ system is a simpler, safer, and more controlled solution:

  Is not subject to as many HSE variables as a semi submersible barge, such as wave height and quayside mooring

  Does not require ballasting operations to support load-out

  Does not require offshore tugs for stability

  Tide Independent
- Directly lowering the floater for wet tow and retrieve floaters back to dry land for major O&M and/or life extension of the FOSW platforms
- Operating as a drydock geographically close to the wind farm for related maintenance vessels, which will be routinely needed for the service life of the turbines
- Integrating all these processes into the port without losing valuable laydown area, supporting industrialization and operational efficiencies



Name	Owner	LOA (m)	Beam Mld (m)	Draught (m)	Est Lightship (tonne)	Weight Density (mT/m)	Australasia Deployment (Time in Last 12 Months, %)
Valentine	Interislander	162.49	25.64	6.50	19,430.32	119.58	100
Kaitaki	KiwiRail	181.60	23.40	5.60	17,074.25	94.02	100
Swan Tide	Tidewater Marine	88.41	18.99	6.66	8,025.35	90.78	100
Skandi Atlantic	DDW Offshore	75.00	17.40	7.00	6,554.19	87.39	80

74 Filtered Vessel Count

1566 Vessel Count

NOT SURE OF YOUR TARGET MARKET AND HAVING TROUBLE OBJECTIVELY JUSTIFYING YOUR INVESTMENT? WE HAVE TOOLS TO HELP ESTABLISH THE VESSELS YOU CAN LIFT AND GIVE INSIGHT TO YOUR POTENTIAL ROI.

Social benefits of the OmniLift™ system include:

- Addressing a major concern of local residents regarding what evidence of offshore floating wind will be left behind at the end of the projects' lifecycle through the ability to retrieve retired floaters.
- The OmniLift™ system's ability to serve as a drydock in the region for decades after the wind farm installation is completed, providing job and business opportunities to the local workforce, port, and ship repair industries.
- Reducing emissions from service vessels by shortening the travel distances for maintenance.
- The fact that platform installation generally optimizes local content and workforce.

This revolutionary integration of proven technologies leverages the strengths of each technology to create a lifting device that expands heavy lift capability beyond what was previously considered possible.

OCEANTIC NETWORK Ventus AWARDS 2023 FINALIST

Launching and recovering with an OmniLift™ system

SHIP SUPPORT SYSTEMS

Bardex designs and manufactures three types of ship support systems; trestles, cradles, and carriages.

Trestles

Trestles are individual structures consisting of one tapered plate girder. Trestles are compatible with SPMT or Rail Based Bogie transfer system equipment. These are most commonly used for submarine docking. Trestles are very flexible and can support a variety of vessels and blocking arrangements.

Cradles

Cradles are a welded assembly consisting of two (or more) trestles with interconnecting steel to support additional keel and bilge blocking. Cradles are compatible with SPMT or Rail-Based Bogie transfer systems. Cradles are flexible and accommodate a wide variety of vessels and blocking arrangements. Fewer cradle assemblies are required, and this design is more efficient in the use of steel material.

Carriages

Carriages are an efficient, low height version of a cradle. These devices operate exclusively on rails. They are towed rather than lifted and transferred. For yards with adequate space and appropriate geometry, carriage systems are usually the lowest cost of ownership. Bardex carriage systems are highly modular and can accommodate a wide variety of vessels.

SHIP TRANSFER SYSTEMS

Transfer mechanisms for moving vessels around a shipyard fall into two main categories: SPMT and Rail-Based Transfer. Bardex designs both types of systems, and we manufacture rail-based transfer systems. SPMT devices are commercially available from several global providers.

SPMT Systems

SPMT systems are the preferred transfer mechanism for yards with irregular geometry. These units are routinely used in complicated heavy load moving applications due to their high capacity and maneuverability. Geology is a consideration; these transporters produce high wheel loads and require a high-capacity drive surface. Facilities located on reclaimed areas or soft ground conditions can require expensive remediation to create the necessary capacity. SPMT devices are complicated machines and require a substantial amount of regular maintenance. The initial purchase cost of SPMT systems is greater than equivalent capacity rail-based systems.

Rail-Based Systems

Bardex designs and manufactures two types of rail-based transfer systems: towed carriages and self-propelled Hydraulic Transporters commonly referred to as "Bogies." Rail-based systems work well at facilities with good geometry where intersections are at right angles. They also provide an advantage in locations with soft ground conditions. The ship loading occurs along the rail system allowing for a cost-efficient foundation design. Vessel support is provided only where required rather than to the entire facility.

Carriage Based Systems

Carriage based systems are an excellent choice for high volume facilities. Carriages are inexpensive to fabricate and maintain. They have the lowest height and require the least amount of steel. Carriages can operate on single rails rather than rail pairs, reducing the CAPEX and OPEX cost of the refit yard. Carriages can be towed using conventional wheeled or tracked heavy equipment. Lateral or change of direction has historically been accomplished by means of a lateral transfer pit or by creating a two level yard. Side transfer capability can be built into the carriages without the need for either feature using the Bardex proprietary modular carriage design.

Bogie Systems

Bogie systems offer ease of operation and efficient use of yard space. They do not require lateral transfer pits or split-level yards to effect a change of travel direction. These devices require fewer personnel to assemble and operate. Bogies have a lower initial purchase cost and maintenance cost when compared to SPMT devices. These systems are fully remote operation.

MEET OUR PROJECT TEAMS

Bardex has the capacity to execute multiple projects simultaneously in varying stages of design, manufacture, test, installation, and commissioning. Our team is experienced in all stages of large-scale projects. It is often possible to use standard designs, reducing the required design time for each unique project. Our experts represent all necessary disciplines, including Engineering, Manufacturing, and Project Management to Quality Assurance/Environment Management and Documentation within our California-based headquarters. Our South Korean facility is similarly capable of large projects simultaneously with a focus on manufacturing and quality assurance.

Project Management and Engineering

Bardex is a matrix organization with a Project Management Office (PMO) responsible for coordinating all projects within the company. As a minimum, Bardex assigns a dedicated Project Manager, Project Engineer, and Quality Engineer to every project. The remainder of the team is assigned proportionately to the design's complexity. CVs for key personnel are available at your request.

Quality Assurance and Environment Management (HSEQ)

Both locations are registered to the ISO 9001:2015 standard. Our Quality Management System has been fully documented and implemented to ensure that specified requirements are met through all phases of development, design, fabrication, installation, and after-delivery services. Quality Manuals and Procedures are available at your request. All sub-contractors chosen for site installation services will need to be qualified by Bardex Quality Management.

Bardex also maintains an Environmental, Health and Safety Management System that is certified to ISO 14001 for Environmental and ISO 45001 for Health and Safety for our facilities in the USA and South Korea.

LIFETIME SUPPORT SERVICES

Bardex has been in continuous operation since 1963. Since our establishment, we have maintained a dedicated, **in-house Field Service Team to ensure all our installations remain in peak operating condition throughout their decades-long service lives.** Bardex maintains Project Design Materials and Manufacturing Records for the life of every project.

BARDEX CORPORATION

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