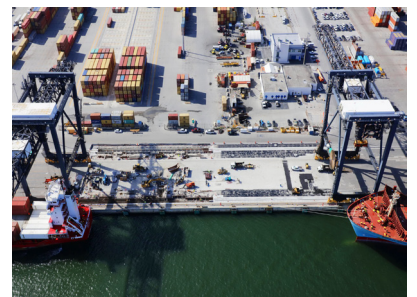
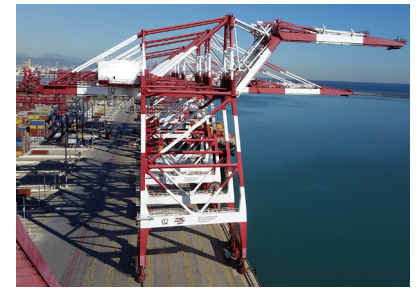


FLOAT DESIGN AND ANALYSIS SERVICES

Liftech Consultants Inc.



Liftech
LIFTECH CONSULTANTS INC.

Liftech Consultants Inc. is a consulting engineering firm, founded in 1964, with special expertise in dockside container handling cranes and other complex structures. Our experience includes structural design for float and wharf structures, buildings, container handling equipment, and container yard structures. Our national and international clients include owners, engineers, operators, manufacturers, and riggers.

Design Philosophy

We design functional, environmentally sound structures for the most economical investment. We believe in converting natural resources and labor into usable facilities that are a blend of aesthetic, structural, and functional considerations. We work well with owners, engineers, contractors, and architects.

Float Design and Analysis

We provide design and analysis services for float structures, including cranes mounted on barges and ships and floats for ferry terminals and other facilities. Projects include design of the following:

Steel barge support structure for the Left Coast Lifter, a 1,700-t capacity shear leg derrick.

Post-tensioned concrete float system including float, gangway, and piling for the WETA South San Francisco Ferry Terminal.

Two steel floats including piling for the WETA Pier 9 layover berths in San Francisco.

Steel float for the WETA Clay Street Ferry Terminal in Oakland.

Pile-supported pier, piling, and concrete float system fendering and mooring systems for berthing up to 12 ferry vessels for the WETA Central Bay Operations & Maintenance Facility in Alameda.

Two new steel floats with associated super structures and mooring berthing systems, three new gangways, and existing float refurbishment for the WETA Downtown San Francisco Ferry Terminal.

Steel float, gangway, prefabricated pier, and piling for a floating fire station in San Francisco.

Steel floats for ferry terminals at Seaplane Lagoon in Alameda and Treasure Island.

More Information

For more information, please visit the Liftech website: www.Liftech.net

Client & Location	Year	Project Description
Power Engineering Construction Co. Treasure and Yerba Buena Islands Ferry Terminal San Francisco, California	2019 to 2020	Designed the steel float for a new ferry terminal located at Treasure Island. Design included berthing and mooring systems, access for future battery systems for ferry electric power, integration with access structures, and compatibility with WETA operations, e.g., ferry vessels, fenders, operations.
Power Engineering Construction Co. Seaplane Lagoon Ferry Terminal Alameda, California	2018 to 2019	Designed the steel float for a new ferry terminal located at Seaplane Lagoon in Alameda. Design included integration with access structures and compatibility with WETA operations, e.g., ferry vessels, fenders, operations.
Power Engineering Construction Co. San Francisco Fire Department 35 San Francisco, California	2017 to 2021	Designed the marine structures for a new floating fire boat station located at Pier 22 ½ in San Francisco. Structures included a 95 ft x 173 ft x 9 ft steel float to support a two-story building with berths for four fire boats, a guest boat, and two jet ski lifts; landside steel pier adjacent to the embarcadero; steel access ramp between pier and float; and piling to moor the float and support the pier.
Power Engineering Construction Co. WETA Downtown SF Ferry Terminal Expansion San Francisco, California	2017 to 2019	Designed the piling, two new steel floats with associated super structures and mooring and berthing systems, and three new gangways for the WETA Downtown SF Ferry Terminal. Designed refurbishment modifications to the existing float to allow for greater compatibility with other WETA floats and vessels and to strengthen the fender supports.
Power Engineering Construction Co. WETA Central Bay Operations & Maintenance Facility Alameda, California	2016 to 2019	<p>The project consisted of a four-story building and a floating system for berthing 12 ferry vessels. Liftech was the prime design engineer for the building and marine structures, designing portions of the building and floating system and integrating the designs of others.</p> <p>Landside design included the building and associated structures.</p> <p>Marine design included a pile-supported concrete pier and a variety of designs for the float system, e.g., platform and ramp systems, berthing and mooring systems, float guide and dolphin piles, a maintenance shed, and the access and connection for a pile-supported crane.</p>
Manson Construction Co. WETA East Bay Ferry Terminal Improvements Alameda and Oakland, California	2014 to 2015	Coordinated and designed various modifications to the Harbor Bay Ferry Terminal in Alameda and the Clay Street Ferry Terminal in Oakland, e.g., supports on top of the existing Harbor Bay float deck for new fixed and moveable ramps, new landside gangway support, and 24 in float mooring piling for Clay Street.
Manson Construction Co. WETA Clay Street Ferry Terminal Oakland, California	2012	Designed a 78-ft long steel replacement float to berth ferry vessels at the Clay Street Ferry Terminal in Oakland. The pile collars are removable and adjustable to accommodate future piles that will be larger than the existing piles. The aluminum walkway has six hinged and mechanically adjustable ramps to allow multiple different ferry types access to either side of the float.

Client & Location	Year	Project Description
Manson Construction Co. WETA Pier 9 San Francisco, California	2010 to 2011	Designed steel float layover berths for Pier 9 in San Francisco consisting of two pile moored floats with berthing, mooring, and access systems.
Manson Construction Co. WETA SSF Ferry Terminal, Oyster Point Marina, So. San Francisco, California	2010 to 2012	Designed a steel truss gangway, mooring dolphins, and post-tensioned concrete float to berth ferry vessels at the South San Francisco Ferry Terminal.



Treasure Island Ferry Terminal
Treasure Island, San Francisco, California

Liftech provided the structural design of the steel float for a new ferry terminal located at Treasure Island.

Reference:
Power Engineering Construction Company
Alameda, California, USA

The design included the float structure, support and connection to the gangway ramp, guide pile collars to restrain the ramp laterally while permitting vertical motion, access for future battery systems, and berthing, mooring, and access systems compatible with WETA ferry vessels and operations. The future battery systems would be installed inside the float through hatches in the float deck and would charge electric ferries that entities such as WETA are currently considering adding to their fleet.

In the image above, the float is at the end (pier and gangway designs provided by others).



**San Francisco Public Works
Fire Boat Station 35 at Port of San Francisco Piers 22.5 and 24
San Francisco, California**

This project was for the design and fabrication of a floating fire station in San Francisco. Liftech was the lead marine design consultant for this design-build project and designed a steel pier next to The Embarcadero; a steel access ramp between the pier and steel float; a steel float and associated items, such as fender supports and pile collars; and the piling to support the pier and moor the float.

Fireboats and jet skis will moor along the float so the firefighters can quickly respond to emergencies. Since firefighters will be spending significant amounts of time on the float, including eating and sleeping, the float is designed to limit the amount of motion.

Reference:
Power Engineering Construction Company
Alameda, California, USA



Alameda Seaplane Lagoon Ferry Terminal Alameda Point, Alameda, California

The City of Alameda and Alameda Point Partners added a ferry terminal at the Seaplane Lagoon in Alameda. The terminal is compatible with the Water Emergency Transportation Authority ferries and operations.

Contractor:
Power Engineering Construction Company
Alameda, California, USA

Liftech provided engineering services for design of the new steel float including float structure and deck supports on the float for components that attach to the float, such as access platforms, ramps, stairs, ship ladders, guide pile collars, bitts, fixed and up-and-out ladders, interior ladders, gangway support yoke, and deck hatches.

Liftech assisted the contractor with obtaining a building permit, providing design support, and providing construction support services.



**Water Emergency Transportation Authority (WETA)
Downtown San Francisco Ferry Terminal Expansion
San Francisco, California**

WETA is expanding ferry service dramatically to accommodate a significant increase in ridership during the past several years. Part of this expansion includes increasing the overall size of the WETA Downtown San Francisco terminal, adding two new ferry gates, and refurbishing the float at an existing gate. The additional gates and more spacious terminal will significantly improve capacity and quality of service.

Liftech designed the piling, two new steel floats with associated super structures and mooring and berthing systems, and three new gangways.

Liftech also designed refurbishment modifications to the existing float to allow for greater compatibility with other WETA floats and vessels.

Client/Contractor:
Power Engineering Construction Company
Alameda, California, USA



**Water Emergency Transportation Authority (WETA)
Central Bay Operations & Maintenance Facility Design
Alameda, California**

This new Operations & Maintenance Facility is the home base for the SF Bay Ferry fleet in the central bay. The facility will be used to maintain vessels operating on the Alameda, Oakland, Richmond, and South San Francisco ferry routes, and to coordinate emergency transportation services during a regional disaster, disruption in transportation, or both.

Liftech is the design prime for this \$52 million essential facility. On the land, the facility includes an operations and maintenance building, fuel yard, working yard, park improvements, and seawall. On the water, the facility includes a pile supported pier, gangway, concrete service float with maintenance shed and crane, and system of pile-moored concrete floats with an array of fendering and mooring systems for berthing up to 12 ferry vessels.

References:

Power Engineering Construction Company
Alameda, California, USA

C. Overaa & Co.
Richmond, California, USA



**Water Emergency Transportation Authority (WETA)
Clay Street Replacement Ferry Terminal
Oakland, California**

Liftech designed a 78-foot-long steel float as a replacement float at the Clay Street Ferry Terminal in Oakland, California.

The project had an accelerated schedule. The previous float needed to be removed and the new float installed in a single weekend. Liftech worked with Manson to provide a design that accommodated the schedule and allowed for a relatively quick and easy float installation. The float design also needed to accommodate future piles, which will be larger than the four existing piles, so the pile collars are removable and adjustable.

Three different ferry types access either side of the float. Liftech collaborated with Manson and their subcontractors to lay out the aluminum walkway with six hinged and mechanically adjustable ramps to provide this access.

Client:
Manson Construction Company
Richmond, California, USA



**Water Emergency Transportation Authority (WETA)
Pier 9 Ferry Layover Berths
San Francisco, California**

Liftech designed two 80 ft by 15 ft by 5 ft steel floats as layover berths for Water Emergency Transportation Authority ferry vessels.

Client:
Manson Construction Company
Richmond, California, USA

Each float is moored with three steel pipe piles. The pile collars are removable and their locations can be adjusted several inches to accommodate float placement at other locations.

An aluminum gangway, walkway, and hinged ramp are provided to access the vessel. Utilities are provided to each float.



**Water Emergency Transportation Authority (WETA)
South San Francisco Ferry Terminal
Float and Gangway
Oyster Point Marina
South San Francisco, California**

As part of a Manson Construction Company design-build team, Liftech designed a 103-foot-long steel truss gangway, a 45-foot-wide by 115-foot-long post-tensioned concrete float, and mooring dolphins. The float is used to berth ferry boats.

The design includes gangway supports that permit large lateral displacements between the pier and float during seismic events.

The ferry terminal is designed to be operational after a large earthquake.

Reference:
Manson Construction Company
Richmond, California, USA

Erik Soderberg**President, Structural Engineer**

Mr. Soderberg is a skilled designer and project manager. He is experienced in the design, review, repair, and modification of a variety of structural and crane related systems including wharves, container cranes, and bulk loader structures. Other structures include crane lift and transfer systems and concrete and steel floats. He oversees the technical and contractual aspects of Liftech's projects in addition to his design work.

**Jonathan Hsieh****Vice President, Structural Engineer**

Mr. Hsieh is experienced in design, review, analysis, and modification of container cranes, bulk handling cranes, and special structures. His expertise includes crane procurement, fatigue failure investigation and repair, and computer modeling and analysis. He has also worked on structural maintenance programs, seismic design of container cranes, crane instrumentation, and voyage bracing.

**Arun Bhimani****Founding Principal, Past President, Structural Engineer**

Mr. Bhimani is an expert in all phases of container crane and wharf design. He has developed innovative solutions to container crane design problems, including a technique for combining analysis with heat straightening for repairing damaged container crane booms, the first seafastening design for transporting fully erected container cranes on barges, and a structural maintenance program used to periodically inspect cranes.

**Catherine Morris****Vice President, Structural Engineer**

Ms. Morris has a wide range of experience in the design of container cranes, buildings, and miscellaneous special structures. She has worked on all facets of container crane design including designing new cranes, reviewing crane designs, designing modifications, and voyage bracing. She has also reviewed and designed reinforcing for barge structures for transport of various equipment, designed chassis storage racks, and analyzed and designed equipment to lift and replace steam generators in nuclear power plants.



Nicholas Grebe**Principal, Mechanical Engineer**

Mr. Grebe has extensive experience performing conceptual and detailed designs of mechanisms and systems, analyzing dynamic mechanical systems, and developing designs and detailed drawings suitable for manufacture. He is responsible for developing purchase specifications and reviewing contractors' mechanical, hydraulic, and electrical designs for feasibility and contract compliance. He is experienced in reviewing heavy machinery and container crane controls including logic, interlocks, system architecture, and automation features. He provides project management, condition assessment, commissioning, troubleshooting, and acceptance testing of material handling equipment including container cranes and bulk loaders.

**Sugiarto Loni****Principal, Structural Engineer**

Mr. Loni has extensive management experience and design expertise with marine terminal structures including crane-wharf interface, container and intermodal yard structures, building facilities, and marine structures. He is responsible for contract negotiations, technical oversight, and quality assurance of project deliverables. His work includes managing a variety of engineering projects ranging from small projects with short duration to large projects with multi-discipline coordination. As project engineer, he performs civil and structural design of marine terminal facilities, seismic retrofit design of existing building structures, and civil and structural design of wharves and marine structures.

**Kenton Lee****Principal, Structural Engineer**

Mr. Lee is experienced in design, analysis, and project management of container cranes, floating cranes, rigging, and special structures. He specializes in container and floating crane procurement projects and crane modification projects. He is also involved in preparing structural maintenance programs. Some of the technical aspects of his work that are of special interest to him are steel connection design, wind effects on structures, wind tunnel testing, and structural fatigue of steel structures.

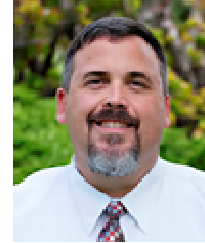
**Patrick McCarthy****Principal, Professional Engineer**

Mr. McCarthy is experienced in ship-to-shore and port yard container crane procurement, modification, reliability, and repairs. His work includes project management, condition assessment, and developing structural maintenance programs and repair procedures. He is Liftech's manager for developing crane technical specifications and helps clients with various aspects of the crane procurement process, including pre-bid assistance, post-award design and fabrication review, and post-delivery structural assessment. He also has expertise in wind provisions, has been involved in wind tunnel and other wind studies, and is an associate member of the Wind Load Subcommittee of ASCE 7.



Derrick Lind**Principal, Structural Engineer**

Mr. Lind is experienced with project management, design, review, analysis, and modification of many types of structures, including container cranes, unique industrial equipment, buildings, wharves, and bridges. He specializes in all facets of crane modification, including crane raises, boom extensions, capacity upgrades, and wheel load feasibility studies. His work has included crane procurement, structural analysis and design, checking shop drawings, developing construction documents, and managing design teams and project budgets and schedules.

**Simo Hoite****Principal, Professional Engineer**

Mr. Hoite is a registered professional engineer with extensive experience in container crane design, modifications, specifications, and procurement, as well as container and rail terminal operations. His experience includes development of innovative RTG and STS crane designs for container terminals. He is also experienced in the heavy rigging industry and has managed substantial design projects including wharf design.

**Anna Dix****Principal, Structural Engineer**

Ms. Dix is a registered structural engineer in California with experience in the design and analysis of various steel and concrete structures. Her focus is on ship-to-shore cranes and other structures that reside next to, in, or on top of the water, such as heavy lift and container handling equipment, wharves, and floating cranes. She likes earthquake and fatigue engineering topics and working with clients.

**Leah Olson****Principal, Professional Engineer**

Ms. Olson has managed multiple wharf and float projects, and has participated in the design, analysis, and modification of wharf and float structures, container cranes, steel barges, and other rigging structures. She has evaluated the behavior of various concrete and steel structures using finite element analysis (FEA) computer software. Her work includes project management, structural analysis and design, and site inspection and reporting.

**Di Liu****Principal, Professional Engineer**

Mr. Liu is an experienced designer and project manager. His work includes structural analysis, design review, modification review, and feasibility studies of container cranes, wharves, and other structures.

