

Heavy Lift Equipment For In-The-Wet Construction

In-the-wet construction methods can generally be categorized into lift-in and float-in.

Float-in construction entails transportation of prefabricated large modules along a navigation route to the project site by self-floatation and/or by means of external buoyancy tanks.

Lift-in construction involves use of heavy lift equipment (typically large floating crane) to transport prefabricated modules to the project site and install them to their final positions in the completed facility. Lift-in methods are generally efficient when large numbers of pre-cast segments have to be installed on site or where environmental or river conditions impose restrictions on the effective use of the float-in method.

Selection of the installation method and equipment for in-the-wet construction is an important design decision. Each installation method and equipment has its special implications to project cost, construction schedules, river traffic, towing and mooring system, installation stability, positioning accuracy, and level of risk exposure during construction.



Heavy-lift catamaran barge, Svanen.



Jack-up crane barge, Lisa A.

Lifting equipment commonly used for lift-in construction:

- Sheer leg crane barges.
- Fully revolving derrick crane barges.
- Jack-up crane barges.
- Catamaran barges.
- Float-over systems.
- Synchronized multiple lifting systems (Versatruss).

In many ways, the installation method for prefabricated modules will at least in part determine the design, construction sequence and schedule. In general, a thorough evaluation of the installation method and equipment is preferably made in the early stage of design, because the installation method and equipment used will often to a large extent affect the structural concept and layout, fabrication of pre-cast components, and construction logistics.

An evaluation of the optimum shape, dimensions, and weight of prefabricated modules should include a cost analysis of the lifting equipment. The total cost of heavy lift equipment to a project is highly dependent on its salvage value and utilization rate. In general, use of large crane barges with high lift capacity is the most effective method for the lift-in construction. In practice, however, there are project-specific, practical limitations due to the availability of heavy lift equipment, physical site access, and economics.

Under a contract with the U.S. Army Corps of Engineers Waterways Experiment Station, Ben C. Gerwick, Inc. has recently completed a study to investigate heavy lift equipment and lift-in technologies for in-the-wet construction. The study investigates the general requirements, specifications, and evaluation/selection criteria for heavy lift equipment used in transportation and installation of large prefabricated modules for construction of navigation structures. The study analyzes the advantages and limitations of various lift equipment that are commonly used for lift-in construction. Each type of heavy lift equipment is evaluated to determine its cost, capacity, production rate, suitability, mobility, and availability for lifting, transportation and installation of large pre-cast modules in U.S. inland waterways. Cost analyses of the lift equipment are performed for various lift capacities, project durations and utilization rate.