



**Ocean and Coastal Consultants, Inc.**  
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## **Ocean and Coastal Consultants, Inc. Corporate History, Technical Competence, and Prior Work History**

**Ocean and Coastal Consultants, Inc. (OCC)**, a COWI USA Company, is a fifty (50) person consulting engineering firm, founded in 1983, that specializes in providing Coastal and Marine Engineering and related professional services to private and public clients. **OCC** provides underwater inspection services with engineer divers and professional engineering services and permitting for dredging projects, marine structures, marine asset management, and coastal projects (wave climate, sediment transport, erosion control, and flood protection). **OCC** provides unique expertise for solving complex problems in the coastal and offshore environments.



Since 1983 **OCC** has been servicing east coast clients from Maine to Florida, and clients in West Virginia, California and Hawaii. **OCC** has also provided services to international clients located in Aruba, Guam, Bahamas and Turks and Caicos. **OCC's** headquarters in Trumbull, Connecticut is only 70 miles from midtown Manhattan, the center of New York Harbor. Of the total fifty (50) full time employees company-wide, thirty-four (34) are engineers and fourteen (14) of those engineers are registered professional engineers. **OCC employs a total of twenty-three (23) Engineer-Divers and ten (10) of those are Professional Engineer-Divers.** In 2003, **OCC**

opened its Plymouth, Massachusetts office which is located 40 miles south of Boston Harbor and 32 miles north of New Bedford Harbor. The Plymouth office has a total of five (5) full time staff including a coastal engineer and PE-Diver, a civil engineer, a structural engineer, and a coastal geologist. In 2004, **OCC** opened its third office in Gibbsboro, New Jersey, just 18 miles from downtown Philadelphia and the extensive Delaware River waterfront facilities. The Gibbsboro office has a total of seven (7) full time staff including two (2) coastal engineers, an ocean engineer, two (2) structural engineers, and a corrosion engineer. There are three (3) Engineer Divers and two (2) of those are PE-Divers.



**OCC's** underwater inspection services are an important

component of the firms overall waterfront work. **OCC** has averaged 110 dive days per year for the past six years. **OCC's** engineer and professional engineer divers must have training compliant with 29 CFR 1910.41, prior to performing dive work. **OCC** requires all divers to be current with annual dive physicals, oxygen administration, first aid, blood borne pathogens, CPR, and AED certification. **OCC** also conducts in house dive seminars and holds a safety meeting every month to review procedures and in-house safety requirements.

**OCC's** engineer divers understand marine structures and write the inspection reports, assess service life, prepare concept designs, design protocol, mooring and wave analyses, and final designs with plans and

specifications. In addition, **OCC's** experience with permitting and resident engineer services provides a complete package for the owner of a marine facility.

**OCC's** clients include the US Coast Guard, US Army Corps of Engineers, ExxonMobil, City of New York, City of New Bedford, and liquid terminal and container port owners and operators from Maine to Delaware. **OCC's** expertise includes a wide range of topics related to waterfront and coastal engineering which are described below:

## **Marine Structures**

- Underwater investigation with PE-Divers using surface supplied air diving techniques;
- Structural and geotechnical engineering design of proposed or replacement marine structures including aids to navigation;
- Engineering analysis of existing structural conditions with comparisons to design requirements;
- Structural analysis of existing coastal structures to determine rated capacity with or without previous design calculations during storm related events;
- Feasibility and concept design studies for coastal structure rehabilitation including engineering alternatives and basis of repair/design reports; and
- Local and Federal permit preparation for activities proposed in the waters of the United States.

## **Coastal Projects**

- Wave climate and coastal studies for FEMA remapping activities, FEMA Region I and Guam;
- Shoreline change analyses and sediment budgets based on assessments of wave climate and sediment grain size;
- Storm damage and erosion assessments including the use of SBEACH numerical modeling;
- Coastal process analyses such as external events, waves and water level, currents;
- Beach nourishment utilizing proposed dredging projects;
- Environmental Assessments in support of permitting efforts;
- In Situ data collection of waves, tides, currents as well as direct measurement of sediment transport through the use of streamer traps;
- Structural design in open ocean, back bay, estuarine and inlet environments. **OCC** has designed projects employing a wide range of materials from rock to sand-filled geotextile tubes, and innovative approaches from very low profile groins to current guiding structures;
- Benefits analysis including storm damage protection, recreation and other social benefits;
- GPS mapping and beach profiles; and
- Shore protection structures, including plans, specifications and cost estimates.

## **Dredging**

- Dredge prism design to accommodate berthing and operational requirements;
- Development of sampling and analysis plans (SAP) and management of sampling and testing programs;
- Preparation of plans and specifications for bidding purposes including bid assistance;
- Hydrographic survey processing for design, pre-dredge and post-dredge volume calculations;
- Permit preparation for dredging and HARS disposal;
- Beneficial use studies for dredged materials; and
- Evaluation of geotechnical subsurface information to evaluate dredging methods.



## Technical Competence

### Underwater Inspection

**OCC** has a staff of structural, civil, and coastal engineers who perform underwater inspections on all forms of waterfront structures. **OCC** has twenty-one (21) engineer-divers, nine (9) of which are Professional Engineers. It is our opinion that this gives **OCC** an advantage in understanding the analysis and behavior of waterfront structures. **OCC** understands the process of evaluating waterfront structures, their unique function, the processes by which they age, and the forces imposed on them by man and nature. The engineers who perform these inspections also write the reports, develop recommendations, repair schemes, alternatives, and prepare the designs. This procedure provides our clients with the most cost effective and constructible designs. **OCC** has developed its capabilities to include all of the disciplines required to understand and design waterfront structures. **OCC** recently expanded its underwater services capabilities with the purchase of a Remotely Operated Vehicle (ROV) that has a range of 300 feet. **OCC's** above and underwater inspection equipment includes:



- Low-Pressure Compressors with Volume Tanks and Filter Racks;
- Kirby Morgan Superlite Diving Helmets;
- Manifold/Communication Boxes (Kirby Morgan DCS-2A and Amron AmCommand I);
- Umbilicals;
- Cygnus I underwater thickness gauges;
- Covermaster CM-9 Rebar Locator;
- Cathodic Protection Testing Equipment (Multimeter and Reference Electrode);
- Digital Cameras with Underwater Housings;
- DVD Camcorder with Underwater Housing;
- Custom designed “Clearwater” box for photography in low visibility and turbid water;
- VideoRay Pro III Remotely Operated Vehicle (ROV) with GPS positioning;
- 14, 20, and 32 foot Survey Boats;
- Cargo Vans; and
- Pick-ups and crew vans.

### Structural and Geotechnical Engineering

**OCC** has a staff of structural and geotechnical engineers that are responsible for the analysis and design of waterfront structures. Waterfront structures include timber piers, wharves, bulkheads, boardwalks, steel bulkheads, revetments, reinforced cast-in-place concrete, and precast concrete structures. Structures in the water are required to resist significant wind, current, wake, wave, and earthquake loading. The Structural Engineer and the Geotechnical Engineer work closely together. The Structural Engineer is responsible for performing the structural analysis and design of a project, preparing construction documents and working closely with the drafting staff, preparing technical specifications, and review of the design under construction as coordinated with the Construction Engineer. Geotechnical engineering for waterfront structures includes design of pile foundations to resist axial and lateral loading, evaluation of soil-structure interaction, design of anchored bulkheads, and geotechnical design for seawalls, armored underwater slopes, and slope stabilization.



## Dredging/Civil Engineering

Dredging and Civil Design Services cover a wide range of services including obtaining the contours of a harbor or river bottom (bathymetry) and developing a new profile for the proposed bottom. **OCC** obtains bathymetric data, develops the profiles and calculates dredge volumes required by both regulatory agencies and owner who will be soliciting bids for the dredging work. **OCC** prepares Contract Documents that the dredge project will use and provides the owner with field engineering services during the dredging work. Dredged material is often required to be tested for potential contamination as well. **OCC** will coordinate testing of samples taken from the area to be dredged and also provides the Owner with recommendations for disposal of dredged material based on the test results.

## Regulatory Services

In addition to the professional design and construction administration services, **OCC** provides regulatory support to owners of waterfront projects. Generally, dredging, new structures or structures in need of repair will be required to have Federal, State, and sometimes Municipal permits. **OCC**'s design concepts take into account these regulations and will incorporate into the design components that help enhance the in-water habitat. **OCC** works closely with regulatory agencies and ecological consultants to prepare an application that meets the owner's needs and also complies with regulatory guidelines. Field work includes surveying of the waterfront property and development of conceptual designs that meet the owner's objectives while complying with the regulations. Work also includes preparing and presenting designs in a public forum.

## Construction Administration/Resident Engineering

Although much of **OCC**'s work is focused on the planning, permitting, inspection, and design of coastal structures, **OCC** also offers considerable expertise in construction support services. **OCC** performs Construction Administration that provides the Owner of a waterfront construction project with a representative who is experienced in waterfront construction. Services on nearshore and coastal projects that we have successfully performed for Owners, contractors and construction management firms include:

- Construction management assistance;
- Cost estimating and scheduling of tidal dependent and underwater work;
- Value engineering, development of alternative designs;
- Topside and underwater inspections;
- Litigation support (expert witness);
- Quality assurance and quality control; and
- Review of shop drawings.

**OCC** has proven expertise in the Construction Administration of marine construction. These services include complex rehabilitation projects including underwater construction, new construction and dredging projects. **OCC** has developed a series of database management tools to facilitate the QA/QC for projects involving multiple contractors and large quantities of materials. **OCC** maintains the ability to develop and maintain complex schedules and is aided by the vast construction knowledge within the firm. Waterfront projects can present many challenges not normally found in the typical upland construction project. Most firms do not have the in-house expertise necessary to effectively manage this sort of project. **OCC** can "fill the gap" by providing the resources of an experienced professional staff who specialize in this sort of work.

Because **OCC** is actively involved in Construction Administration, we have developed a database of marine construction costs. This database includes durations of various activities, labor costs and material costs. The database is kept current due to the ongoing work that **OCC** performs.



## Coastal Engineering

The shoreline is a dynamic environment where sand and sediment are constantly moving. Structures and features designed along the shoreline must withstand many forces associated with wind, tides and wave action. **OCC** has a staff of eight coastal engineers who are responsible for determination of wind and wave forces on coastal structures. State of the art computer and mathematical numerical modeling enables us to model offshore and coastal wave environments, sediment transport, and shoreline changes. Coastal processes analyses include the assessment of littoral drift, erosion and sedimentation patterns, storm damage, inlet and shoreline management plans, FEMA flood studies, and Letters of Map Revision. **OCC** has also performed many engineering designs for beach nourishment, innovative coastal structures for shoreline stabilization and erosion control, port and harbor facilities, and marinas.

## Coastal Resource Evaluation

**OCC** performs Coastal Resource Evaluations that include determination of physical and biological coastal resources that may be impacted by construction, development, or dredging. **OCC** performs field delineation and monitoring of physical coastal resources such as beaches and dunes, and biological resources such as shellfish habitat and coastal vegetation, and determines the functional values of these physical and biological features. **OCC** strives to develop concepts and designs that improve or enhance the shoreline. **OCC** works closely with Municipal, State, and Federal regulatory agencies to develop designs that help offset and mitigate the effects of waterfront construction.

## IT/GIS Database Development

Waterfront structures require routine underwater inspections, maintenance and repairs because they are exposed to the harsh marine environment. These critical structural components are below the low tide level and can be easily overlooked. **OCC** uses facilities management tools to track many components of a waterfront facility. These components include structural elements, regulatory permits, and maintenance inspection schedules. **OCC** is on the leading edge of this technology using web-based databases and Geographic Information Systems (GIS), which enable key facility personnel to access information or receive automated notices to track the status of waterfront structures they rely upon.

## Project Experience

**OCC** draws on the extensive marine construction experience of the professional staff in preparing constructible project plans and specifications and in the development of realistic opinions of probable costs. **OCC** typically maintains approximately one hundred (100) active projects with construction values ranging from \$10,000 to more than \$40,000,000.

**OCC** provides innovative solutions to complex rehabilitation problems on marine structures and has designed in excess of 25,000 linear feet of replacement timber and steel bulkheads within the past ten (10) years. Our professional staff members have extensive experience in the construction of marine facilities. Many of the senior professionals have worked for marine construction firms and have performed in responsible roles in the construction of major structural repairs.

**OCC's** on-going and recent work includes multiple projects in New England and the New York Harbor area. In the last five (5) years, **OCC** has been one of the leading firms in NYC providing rehabilitation design and resident engineering services for a wide range of structures including piers, wharfs, and seawalls. Our major clients include the New York City Economic Development Corporation (NYCEDC), IMTT Bayonne, Global Container Corporation, and a pending contract with the NYC Department of Transportation (NYCDOT). Projects for these clients, as well as our work for the United States Coast



Guard (USCG), United States Army Corps of Engineers (USACE), and for a Confined Disposal Facility and Commercial Wharf in the Boston area are presented in the following paragraphs.

For NYCEDC alone, we have worked on four (4) projects totaling over \$9 million construction dollars in substructure rehabilitation. On all of these projects, OCC's PE-divers and engineer-divers performed the design level underwater investigation, obtained the permits, prepared the contract documents, and provided part-time resident engineering services during construction. These projects included:

- **Pier 16** – In 2005 and 2006, OCC designed repairs to the substructure of Pier 16 as part of a phased program to rehabilitate the severely deteriorated piles. During the construction, OCC's PE-Divers and Engineer-Divers performed the review of approximately 1,900 linear feet of encasement and encapsulation.
- **Piers 13 and 14** – OCC has been involved on the two (2) most recent rehabilitation projects of these piers (2003 and 2008). OCC's PE-Divers and Engineer-Divers performed the review of approximately 1,700 linear feet of encasement in both phases. In addition, OCC's divers reviewed concrete deck repairs as well as repairs to the timber pile caps and stringers.
- **Pier 1** – In 2007, OCC's PE-Divers and Engineer-Divers performed the review of approximately 1,750 linear feet of concrete encasement for this pier in Staten Island.
- **Pier 42** – In this ongoing project (which began in 2007), OCC is providing resident engineering services for over 6,200 linear feet of concrete encasement and epoxy encapsulation. In addition, OCC's divers are reviewing concrete pile cap repairs and sacrificial anode cathodic protection.



OCC will have performed over 80 days of diving to review over 2 miles of encasements and encapsulations in these projects.

OCC has provided consulting engineering services for a large liquid terminal facility in Bayonne, New Jersey since 1994, providing marine engineering, dredging, permitting, and program management services. OCC continues to provide marine engineering and consulting engineering services for port and harbor infrastructure for this 600 tank, 15.3 million barrel capacity, liquid terminal facility covering over 520



acres. The facility has six recently dredged deepwater tanker berths and twelve barge berths. OCC services have included underwater investigation with PE-Divers, moored vessel analysis, rehabilitation and new structure design for piers, trestles, and berthing facilities, preparation of design plans and specifications, bid assistance, structural resident engineering services and program management for environmental remediation activities. Additional services provided include hydrographic survey, volume calculations, sampling analysis plans for dredged

material disposal options, dredge design, cost estimates, permitting, and resident engineering services for berth deepening and maintenance dredging.

In the last 5 years **OCC** has been responsible for over \$30 million construction dollars at the facility that includes rehabilitation of piers and wharfs, emergency repairs, dredging, and environmental remediation.

For Global Container Corporation in Bayonne, New Jersey, **OCC** has provided underwater investigations, in-depth studies of the cause of cracks in concrete piles, dredge design and permitting, and a geotechnical study to evaluate the effect of deepening the container ship berth. The concrete pile investigation concluded that a phased maintenance program should be undertaken to repair the concrete piles. From the results of **OCC's** underwater investigations, the 1,200 precast prestressed concrete piles have been prioritized by the severity of cracking and a schedule of repairs with plans and specification prepared. A 5 year, \$5 million program is underway to perform the maintenance and repairs on the piles. **OCC** is performing underwater resident engineer services for this maintenance program and has been the resident engineer for dredging for the berth deepening project.



In addition to our extensive resident engineering experience for NYCEDC, **OCC** has specific experience at the New York Cruise Terminal (NYCT), located on the west side of Manhattan on the Hudson River:

- **OCC** recently performed the underwater investigation of Pier 92 for NYCEDC (December 2007) and prepared a complete Routine Inspection report. **OCC** will be preparing permits and contract documents for the pier substructure this summer.
- **OCC's** Project Manager for this project (Mr. Stephen Famularo, P.E.) was the Project Manager for the above Pier 92 inspection and was the Project Engineer for the previous Routine Inspection of all three NYCT piers in 1999. Mr. Famularo developed a comprehensive database for the inspection, personally participated in the above water and underwater investigation, and prepared the Routine Inspection Report.
- **OCC** has been extensively involved with the dredging operations at the NYCT for the last three (3) years and is very familiar with the pier operations and constraints with regards to both the inspection and the design. (see discussion below)
- Finally, **OCC** has participated in peer review projects for the rehabilitation of the pier. Notably, Turner Construction Company requested **OCC** review the mooring analysis report prepared by DMJM+Harris prior to the arrival of the Queen Mary 2.

Over the last 5 years, **OCC** has designed, permitted, and provided resident engineer services for over 1.5 million cubic yards of dredge material. For the past three (3) years, **OCC** has provided the NYCEDC with engineering services for the annual maintenance dredging for the NYC Cruise Terminal located on the Hudson River in Manhattan. **OCC's** services in 2005 and 2006 included hydrographic survey, dredge design, preparation of plans and specifications, volume and cost estimates, bid assistance, and resident engineering services. **OCC's** services expanded in 2007 to provide permitting services for Historic Area Remediation Site (HARS) disposal



for the 2007 dredging as well as for the next two years. In addition to the resident engineering services, **OCC** prepared the sampling analysis plan, managed the sampling and extensive aquatic testing, and prepared permit application and drawings. The 2007 dredge volumes included 250,000 cubic yards disposed of at HARS and 70,000 cubic yards of upland disposal. **OCC** has also been selected to manage the 2008 maintenance dredging effort.

The New York City Department of Transportation has issued a contract to **OCC** for Resident Engineering Services that are related to the repairs to approximately 6,500 linear feet of the FDR Drive on the east side of Manhattan. This section of the roadway is a low deck structure supported on 15,000 timber piles. **OCC** has performed two inspections of this roadway since 2002 under a contract with PB Ports and Marine, who is the engineer of record. This is a \$15,400,000 engineering contract with duration of 4.5 years. Construction, with an estimated value of \$80,000,000, is anticipated to start in 2008.

**OCC** is providing the United States Coast Guard Civil Engineering Unit (CEU), Providence and CEU Cleveland with marine engineering services, including underwater inspections at USCG stations throughout New York and New England and Cape May, NJ. To date, the total value of engineering services is over \$1 million with a total construction value of over \$10 million. Engineering services have included: field investigations, underwater inspections (with Professional Engineer Divers), engineering analysis of existing conditions, structural analyses, waterfront engineering feasibility studies, plans and specifications for repairs, instrument support structures, documentation of findings and report preparation, engineering report review, technical review and cost estimating for waterfront facility repairs. Work products have included CADD drawings per A/E/C standard, construction contract drawings, SPECSINTACT (with SGML), calculations, static and dynamic analysis, 2-D and 3-D modeling and rendering, drawings and specifications in PDF format, dive safety plans, inspection reports, alternative analyses, and basis of repair reports. Inspection and design services have included piers, wharves, bulkheads, quaywalls, offshore towers, instrument support structures, floating docks, groins, seawalls, revetments, boat hoists and moorings.



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**OCC** performed three task orders for an Indefinite Delivery / Indefinite Quantity Contract for Navigation, Contract No. DACW51-02-D-0016, for the New York District USACE which **OCC** performed investigation, design, and cost estimating in support of Channel Deepening of project areas within the Arthur Kill Waterway between Shooter's Island and the Elizabeth Town Marina (AK-2 and AK-3). **OCC** characterized contaminated sediments and prepared plans and specifications for abandoned pipeline removal. Our

experienced Engineer Dive staff provided coordination and safely dove on pipeline targets in the busy AK waterway.

**OCC** has completed performing resident engineering services for a Confined Disposal Facility (CDF) in Everett, MA which **OCC** designed in late 2005 (construction value exceeding \$40,000,000). The facility is comprised of an offshore, 1,000 foot by 41 foot steel sheet pile cofferdam cellular structure.



Approximately 70,000 cubic yards of contaminated sediments were treated insitu below the CDF as well as within and landward of the CDF. Contaminated sediments were removed seaward of the CDF to a depth of 37 feet below mean low water. Completed with a concrete deck in 2007, the structure is a high capacity wharf suitable for a wide variety of water dependent uses.

## Quality Assurance

The purpose of a Quality Assurance Plan is to codify Ocean and Coastal Consultants, Inc. (OCC) long-term commitment to customer satisfaction and continuous service improvement. The essential components of company-wide quality are a dedication to exceeding customer expectations, leadership, continuous training and learning, empowerment, and reducing variation in every organizational process.

Always working toward this goal will assure the long-term success of OCC as a leader in Marine and Coastal Engineering Services, will differentiate OCC in the marketplace, and secure a position of competitive advantage.

The OCC Quality System is a structured and documented management system describing the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan for ensuring quality in all our work processes, products and services. The Quality System provides the framework for planning, implementing, and assessing work performed by the organization and for carrying out quality assurance procedures and quality control activities. This will ensure that during the prosecution of the work, OCC will provide adequate professional supervision and quality control to assure the accuracy, quality, completeness, and progress of the work.

A Quality Control Plan will document OCC's Quality System in terms of the organization's structure, the functional responsibilities of management and staff, the lines of authority, and the interfaces for those planning, implementing, and assessing all activities. OCC previously prepared the Quality Control Plan that OCC utilized for the successful completion of the USACE Arthur Kill Pipeline Location Project.

## Management Philosophy

A key requirement for successful task management is a Work Order planning, implementation and monitoring process, which assures satisfactory delivery of work tasks on time and within budget. Necessary ingredients for this include a detailed understanding of the specific work required, and flexible procedures for allocating staff and management resources. To achieve these goals, our management philosophy embodies the following four basic principles:

1. Interactive and rapid lines of communication
2. Clarity in assignment of responsibilities and authority
3. Thoroughness in carrying out coordination between the task team and the client, as well as within the study team itself; and
4. Commitment of OCC Team resources to fully satisfy client needs.

The task management plan embodies these principles and incorporates the functions, linkages, responsibilities and authorities necessary to conduct the services in the most effective and efficient manner. The Managing Engineer, Mr. Stanley White has the qualifications and skills to develop and execute the management plan.



The Quality Assurance/Quality Control specialist will assist in the review of the technical work plans, maintain files on staff availability and provide technical support and backstopping. For each Work Order, the Managing Engineer will designate the QA/QC specialist who will be responsible for assisting in monitoring the technical progress of the assignment. The Task Leader will report directly to the Managing Engineer, coordinate the flow of technical information, resolve technical problems, etc. While the Managing Engineer will be responsible for administering the numerous ongoing work orders, the designation of a Task Leader among the key personnel assigned to this contract ensures that one individual will maintain day-to-day control over critical technical aspects and backstopping of each assignment while the teams are in the field. In this way, technical problems that arise during field investigations, analysis and reviews can be dealt with expeditiously, thus avoiding slippage of the project schedule.

The Task Leaders will be designated for specific types of work orders based on their areas of expertise. They will provide technical continuity from one work assignment to the next. The Task Leaders are also available to serve as Technical Staff in their area of expertise on individual Work Orders. A number of highly qualified professionals, covering all the necessary disciplines required for the project, are available from the project Team's staff.

