

# KEVIN R. BODGE, Ph.D., P.E.

Senior Engineer, Vice-President  
OLSEN ASSOCIATES, INC.

## Education

*Doctor of Philosophy, 1986.* University of Florida; Gainesville, Florida.  
Engineering Mechanics; Coastal and Oceanographic Engineering.  
Major Advisor: Robert G. Dean, Sc.D.

*Master of Civil Engineering, 1982.* University of Delaware; Newark, Delaware.  
Civil Engineering (Ocean Engineering Specialty).  
Major Advisor: Robert G. Dean, Sc.D.

*Bachelor of Science, 1980.* Virginia Polytechnic Institute and State Univ.; Blacksburg, Virginia  
Aerospace and Ocean Engineering. Cum Laude.

*Other.* SCUBA certified (30 years experience in technical, commercial and Nitrox diving).  
Licensed Amateur Radio Operator (1974 - )

## Professional Employment History

1986-present: Principal Engineer, Senior Vice-President – Olsen Associates, Inc., Jacksonville, FL

1990-1998: Adjunct Instructor – Jacksonville University (Marine Sciences), Jacksonville, FL

1983-1986: Graduate Research Assistant & Instructor – Univ. of Florida, Gainesville, FL

## Fields of Competence and Experience

Coastal and oceanographic engineering; specifically including all aspects of

- physical surveys and assessments of marine (coastal / ocean / estuarine / seabed) sites,
- development and evaluation of engineering designs, construction plans, specifications, solicitations
- regulatory permitting (federal, state, and local, including NEPA compliance)
- analysis of wave, wind, sedimentary, tidal, storm, and other hydrographic processes,
- plan formulation and project master-planning (coastal elements), and
- construction review and post-project physical monitoring related to marine-related projects,

In regard to (among others):

- beach/dune nourishment, coastal structures, dredging and dredge disposal, shore protection
- inlet sand management, navigation and harbor design
- erosion prediction, set-back and elevation design, shorefront management & regulation
- coastal, estuarial and insular shorelines (mangrove, sand beach, marsh, rock & ironshore)
- seawalls, revetments, bulkheads, groins and breakwaters
- marinas, piers, boat and seaplane ramps
- coral reefs and hard bottom resources, seagrass beds, mitigation design, and
- oceanfront residential, recreation and resort development.

---

## **Professional Experience**

---

*General* - As a senior engineer for the coastal engineering consulting firm of Olsen Associates, Inc. since 1986, Dr. Bodge personally manages, directs and executes engineering analysis and design related to a diverse mix of shore protection, navigation, oceanfront development, and natural resource issues in the coastal (marine) environment. His site-specific experience is extensive throughout the southeastern US, Caribbean Basin, and Central America, with significant additional project experience in Hawaii, Dubai, and the Maldives. His contributions to the coastal engineering community are nationally and internationally recognized, particularly in regard to beach restoration, innovative use of coastal structures, and sand management at inlets. Dr. Bodge's work draws upon significant, state-of-the-art research experience in field studies and theoretical analysis -- combined with fundamental aspects of design and marine construction intrinsic to conventional civil engineering practice.

*Beach Restoration* - Dr. Bodge has served as the Engineer of Record, Design Engineer, or consulting coastal engineer, for over forty beach nourishment projects constructed in the southeastern U.S., Caribbean, Dubai and Indian Ocean. The scale of these projects range from small residential/resort properties to large civil works projects spanning many miles of coastline. His experience includes formulation and economic analysis of project alternatives, computation of fill equilibration and storm erosion, sand source development, permitting, easement acquisition, development of construction plans and specifications, construction review, and pre/post-construction monitoring. Many of these projects have introduced novel sand placement methods that have resulted in significant cost- and time-savings for project construction. These include sand re-handling from the nearshore disposal areas to the shoreline (Cocoa Beach and Melbourne Beach, FL 2000-02) and truck-haul transfer from sand stockpiles that are hydraulically pumped onto the beach (Patrick Air Force Base, FL, 2005). All of these projects utilized a diverse range of sand sources – including offshore and upland borrow areas, inlet maintenance, and the first large-scale use of aragonite sand imported from the Bahamas (Fisher Island, FL 1990-91). The majority include dune restoration, including sand fencing and vegetation. About one-quarter of these beach restoration projects are Federal Shore Protection Projects for which Dr. Bodge represents the local sponsor as the consultant coastal engineer and Permit Agent (e.g., Duval County, FL; Brevard County FL; et al.) The remainder are non-federal, municipal, and/or private-sector works for which Dr. Bodge is the Project Engineer. All of these projects have helped to establish the reputation of Olsen Associates, Inc. as a leading designer of innovative and successful beach restoration projects.

*Coastal Structures* – A majority of the beach nourishment projects described above -- including those in Bonita Beach, Ocean Ridge, Fisher Island, and Amelia Island (Florida) Tybee Island (Georgia), Paradise Island, Sandals, and multiple projects on Lyford Cay (Bahamas), Jolly Harbor (Antigua), Bald Head Island (North Carolina), Atlantis (Dubai), One & Only Reethi Rah (Maldives), among others -- have introduced the use of unique "tuned" structures, such as T-head groins and detached breakwaters – to stabilize the beach fill. Use of these structures has successfully reduced beach fill requirements without damage to adjacent shorelines. Dr. Bodge co-designed the beach restoration project at Fisher Island (Miami), Florida, in 1990, which was the principal project to re-introduce the prudent use of coastal structures to stabilize beach nourishment. In 1998 and 2002, Dr. Bodge authored early design guidance regarding the use of such structures, which remains in practice today. He has prepared designs and construction plans for a variety of shore protection structures, including seawalls, revetments, and bulkheads at several dozen locations in the US and abroad, in addition to construction review of these works.

*Inlet Sand Management* – Dr. Bodge is recognized for significant contributions to the analysis, design, and implementation of inlet management strategies to decrease the erosional impact of inlets upon adjacent beaches, decrease dredging requirements, and increase reliability of navigation. He is the author of the chapter on Inlet Sand Management in the U. S. Army Corps of Engineers' Coastal Engineering Manual

(CEM), co-author of an Army "needs analysis" on numerical modelling of inlet-beach interactions (1995) and participated as a speaker at several Corps' workshops regarding this topic (1993-96). He is an outspoken advocate for mitigation of inlet impacts upon adjacent shorelines. At Canaveral Harbor, FL, after twenty years effort, Dr. Bodge contributed to the federal government's ultimate recognition that the navigation project at that location was responsible for 100% of the erosion along the downdrift shoreline – resulting in a substantial change in cost-sharing for shore protection. During that time, with the Canaveral Port Authority, he developed and helped to implement the Port Canaveral Inlet Management Plan (1992-94) that ultimately reduced the inlet impacts from 350,000 cubic yards to nearly zero. The project includes sand bypassing, interim and permanent jetty improvements, sediment deposition traps, mitigation for historical inlet impacts, and introduction of the first regular, nearshore disposal of suitable dredged material from a federal navigation project in the State of Florida (1992). Dr. Bodge has additionally performed related analyses and inlet management improvements at other locations; including Morehead City Harbor Federal Navigation Project (NC), Old Fort Bay (Nassau), South Lake Worth Inlet (FL), among others. In conjunction with Waterway, Surveys and Engineering, Dr. Bodge was the Engineer of Record for infrastructure improvements at Rudee Inlet, Virginia Beach, VA (2004-06).

*Marina, Waterway and Pier Development* – Dr. Bodge has provided designs for a wide variety of marinas and waterways, particularly at resort settings in the Caribbean basin. These range from the original concept design of the marina at Atlantis, Paradise Island, to complete construction plans for docks, dredging, inlet design, jetties and breakwaters, and navigation aids at dozens of marina sites throughout New Providence and the Family Islands (Bahamas). Dr. Bodge has likewise designed numerous boat landings, boat ramps, seaplane ramps, commercial and private quays/piers and docks which have been constructed at these locations, in addition to Dubai and the Maldives, and in development in Panama & Costa Rica.

*Regulatory Permitting and Environmental Compliance* - Dr. Bodge has acquired federal and State environmental regulatory permits for a variety of complex marine projects. These include, to list a few, beach restoration and coastal structures in Florida including Fisher Island, Patrick Air Force Base, Bonita Beach, Amelia Island, and Ocean Ridge; beach nourishment and sand bypassing at Cape Canaveral, Cocoa Beach, and Duval County, Florida; nearshore disposal of maintenance-dredged material, jetty improvements, and nearshore dredging of sand borrow material for Port Canaveral, Florida; and a coral reef restoration project in the Florida Keys National Marine Sanctuary. Dr. Bodge is also responsible for the implementation of physical and environmental monitoring for the majority of these projects, as required by the project permits -- including issues related to beach and borrow area surveys, data analysis, beach compaction and tilling, and endangered species protection. He is a principal contributing author/editor of several Environmental Assessments and Supplemental Environmental Impact Statements for beach and inlet projects throughout the Bahamas, and for numerous federal shore protection projects (including at Brevard County (Mid Reach), Florida, which features extensive nearshore hardbottom).

*Resort Development* – Dr. Bodge has prepared plans and designs for all manner of coastal (oceanfront) elements at private and commercial resort developments throughout the Caribbean Basin and elsewhere. These works have included planning and design of marinas, docks, navigation channels; recreational beaches; dunes, beaches, and seawalls and other coastal structures for purposes of shore protection; perimeter design and stabilization of oceanfront golf courses; setback and elevation requirements for oceanfront development; intake and outlet layouts for mega-scale aquaria; siting evaluation for private residential and resort developments; and comparative economic evaluation (and B/C analysis) of beach management alternatives for many different coastline settings. Notable project experience includes Atlantis/Paradise Island (Nassau), Atlantis/The Palm (Dubai), Sandals Royal Bahamian (Nassau), Ritz Carlton at Rose Hall (Montego Bay, Jamaica), among numerous others.

*Hydrodynamic and Related Studies* - Briefly, Dr. Bodge has directed several dozen hydrographic studies

which pertain to inlet (current) flow and sedimentary stability; flushing (water quality) studies within canals and marinas; wave and storm predictions across open water and semi-enclosed basins; and structural stability of submerged and semi-submerged marine structures. Olsen Associates, Inc. was among the first coastal engineering consulting firms in the US to utilize numerical models in their professional practice; and Dr. Bodge wrote the software initially used by the firm to compute wave refraction, diffraction, and consequent littoral transport patterns, for many years. Over his career, Dr. Bodge has also developed, tested and patented marine instrumentation to measure the directionality of ocean waves, temporal fluctuation of storm surge, and tidal water level data. As such, he is familiar with most all types of marine measurement systems, data retrieval, and analyses.

*Coastal and Ocean Engineering Expertise* - Dr. Bodge has performed peer review of numerous projects and design manuals. These include federal plans for a groin field near Fort Pierce Inlet, FL (2008); groins at Longboat Key, FL (2007); independent expert peer review of Corps of Engineers projects (2009-10); among many others. On behalf of the Corps of Engineers, he has reviewed various technical studies regarding longshore sediment transport on beaches (1989-91) and early chapters in the Coastal Engineering Manual (CEM). He was a peer reviewer for a federal highway design manual on coastal roadways (2007-08). He has prepared technical critiques of numerical modelling methodologies employed by the State of Florida to establish construction "set-back" lines -- resulting in refinement of the State's methodologies. Dr. Bodge has also prepared a coastal engineering design manual for the geotechnical/structural firm, Tensar Earth Technologies, Inc. (1994-96).

*Various Other Qualifications and Project Experience --*

*Bathymetric and Other Surveying* - Dr. Bodge has over 3000 hours' experience in beach profile and seabed surveying. He has formulated bathymetric, geotechnical and magnetometer (archaeological) survey plans for marine survey firms for dozens of projects, including the coral reef restoration work discussed above and numerous inlet and beach studies.

*Coral Reef Restoration* - Dr. Bodge was the design engineer for the world's first large-scale structural restoration of coral reefs damaged by vessel groundings. This project, completed for NOAA in 1995, involved two sites within the Key Largo National Marine Sanctuary (NMS) and one site within the Looe Key NMS. The design introduced numerous innovations in marine construction -- including novel underwater concretes and pre-fabricated, reinforced-concrete reef-replicating structures -- necessitated by the sites' shallow waters and proximity to sensitive living corals. Dr. Bodge has performed hydraulic stability analysis of artificial reef modules at several ocean locations, including Sunny Isles, FL in 1991.

*Other Restorations* - In 1994, Dr. Bodge assessed the injured seabed at a vessel grounding site upon seagrass beds within the Florida Bay (Florida Keys NMS); including analysis of site sedimentary stability and the development of engineering alternatives for seabed restoration. That same year, working with a marine biologist, he surveyed an existing rock jetty in Key Largo (c. 1965) for a private client; and, for reasons of marine habitat, dissuaded the State's removal of the structure.

In work undertaken for the Dept. of Justice, Dr. Bodge was the principal technical advisor for his firm's analysis of the sedimentary stability of coal dumped upon the seabed during a storm at Pensacola Bay Entrance, Gulf of Mexico, in 1995.

In 1991 and 2008, he was the Project Engineer for restorative works required to stabilize an inlet cut by large waves which divided an island resort in two (Salt Cay, Bahamas). In 1992, Dr. Bodge was the Engineer-of-Record for the creation of a naturally flushing, 3-acre lagoon from a relic inland salt pond at a privately-owned island in the Bahamas.

Dr. Bodge acquired Florida's first permit for open-water discharge of dredged sediment in a river (1987), related to an underwater archaeological expedition to locate and explore a civil war shipwreck within the St. Johns River, Florida. He most recently completed a feasibility study and acquired permits for a demonstration rainbow-discharge project for nearshore beach nourishment near Melbourne, FL.

---

**Other Professional Activities, Affiliations and Awards**

---

US Patent #4499762 – [Differential Pressure Gauge Directional] Water Wave Monitor  
Jointly patented with Robert G. Dean; February 19, 1985.

Registered Professional Engineer: States of Florida, Hawaii, and Virginia.

Diplomate (certification) in Coastal and Port Engineering, ACOPNE.

Member, American Society of Civil Engineers (ASCE). 1986-present.

Member, Bahamas Society of Engineers.

Member, Board of Directors, Association of Coastal Engineers (ACE). 2000-present.

Florida Shore & Beach Preservation Association's 1995 Engineering [Jim Purpura] Award for "outstanding contributions to coastal engineering that enhance beach preservation"

Florida Shore & Beach Preservation Association's 2001 Per Bruun Distinguished Service Award for "innovative strategies that enabled construction of a 9.4-mile stretch of beach in Brevard County to be accomplished in five months, one year ahead of schedule, and saving the County well over a million dollars."

Coastal Engineering Practice '92 (ASCE). Long Beach, California; April, 1992. Program Chairman and Head, Technical Committee.

*J. Coastal Research*: Technical Reviewer, 1987-2002.

*J. Waterways, Port, Coastal and Ocean Engineering*: Member, Publications (Editorial) Committee

Florida Sea Grant Program. Project Review Committee member. 1988-1992, and various dates.

Member, Board of Directors; American Shore & Beach Preservation Association, 1999-2002.

International Conference on Coastal Engineering. Speaker. 1984, 1988, 1990, 1994, 1996, 2002, 2006.

Beach Preservation Technology Conference. Executive Organizing Committee and Speaker. 1987-present.

Coastal Zone Conference. Speaker, 1986 - 1992.

Coastal Sediments '91. Seattle, June 1991. Organizer, longshore sediment transport session.

---

**Testimony & Hearing Experience** (partial listing)

---

Kawana Marina vs. State of Florida, 1995. For the plaintiff toward protection of a rock jetty/marine habitat adjacent to the Key Largo National Marine Sanctuary. (Case settled prior to judgement.)

State of Florida vs. Johnstone, 1996 (ongoing). Expert witness for State in regard to a homicide involving a USN sailor and disposition of body within hydraulic (riverine) currents.

Dames & Moore vs. Siegel-Robert, Inc., 1996. Expert witness for the defendant in regard to the failure to-perform of an oceanfront rock revetment.

Hyatt Regency Resort, Kaua'i, Hawai'i, 1996-98. Regarding appropriateness of original oceanfront siting and elevation of a multi-million dollar resort devastated by Hurricane Iniki.

Brevard County Shore Protection Project. 2000-2002. Expert witness for Brevard County in regard to condemnation of sand beach areas to procure easement for beach nourishment construction.

**Publications** (Partial Listing from among over 200 papers & reports prepared since 1983)*\* Peer-Reviewed Literature*

- \*Bodge, K. R., 2008. "Island Repair in the Maldives", *Shore and Beach*. Vol 76, No. 4, pp. 17-24. Fall 2008.
- \*Bodge, K. R., 2006. "Alternative Computation of Dean's Overfill Ratio" *J. Waterway, Port, Coastal and Ocean Engineering*. ASCE. 132 (2). March/Apr. il 2006.
- \*Bodge, K. R., 2002. "Design Aspects of Groins and Jetties". Special Report on Advances in Coastal Structure Design. Amer. Soc. Of Civil Engineers.
- \*Creed, C., K. Bodge, and C. Suter, 2000. "Construction Slopes for Beach Nourishment Projects." *J. Waterway, Port, Coastal and Ocean Engineering*. ASCE. 126(1). Jan/Feb 2000.
- Bodge, K. R., 1999. "Inlet Impacts and Families of Solutions for Inlet Sediment Budgets", Proceedings, Coastal Sediments '99. ASCE. July 1999.
- Bodge, K. R., 1998. "Beach Fill Stabilization with Tuned Structures: Experience in the southeastern USA and Caribbean." *Proc., Coastlines, Structures and Breakwaters '98*. Thomas Telford Publishing. 1 Heron Quay, London E14 4JD.
- \*Bodge, K. R., Creed, C.G., Raichle, A. W., 1996. "Improving Input Wave Data for Use with Shoreline Change Models", *J. Waterway, Port, Coastal and Ocean Engineering*.
- Bodge, K. R., 1996. "Structural Restoration of Coral Reefs Damaged by Vessel Groundings", Proceedings, 25<sup>th</sup> Int. Conf. on Coastal Engineering, 1996. American Soc. of Civil Engineers. New York. Volume 3, pp. 4261-4273.
- Bodge, K. R., 1994. "The Extent of Inlet Impacts upon Adjacent Shorelines", *Proc., 24th Int. Conf. on Coastal Engineering*, ASCE, Kobe, Japan; pp. 2943-2957.
- Olsen, E.J., Bodge, K.R., and Creed, C.G., 1994. "Shore Protection Design Alternatives Downdrift of an Inlet", *Proc. Beach Preservation Technology '94*, FSBPA, Tampa, FL.
- \*Bodge, K. R., 1993. "Gross Transport Effects and Sand Management Strategy at Inlets", *J. Coastal Research*, Special Issue No. 18; Fall, 1993.
- \*Bodge, K. R., 1992. "Representing Equilibrium Beach Profiles with an Exponential Expression", *J. Coastal Research*, Vol. 8, No. 1, 47-55; Winter, 1992.
- \*Bodge, K. R. and E. J. Olsen, 1992. "Aragonite Beachfill at Fisher Island, Florida", *Shore and Beach*, Vol. 60, No. 1, pp. 3-8; January, 1992.
- \*Bodge, K. R., 1991. "Damage Benefits and Cost Sharing for Shore Protection Projects", *Shore and Beach*, Vol. 59, No. 2, 11-18; April, 1991.
- Bodge, K. R. and N. C. Kraus, 1991. "Critical Examination of Longshore Transport Rate Magnitude", *Proc., Coastal Sediments '91*, ASCE, Seattle, WA; pp. 139-153.
- \*Bodge, K. R., 1989. "A Literature Review of the Distribution of Longshore Sediment Transport Across the Surf Zone," *J. Coastal Research*, Vol. 5 (2), 307-328; Spring, 1989.

Partial Listing of Publications; Continued.

- Bodge, K. R., 1987. "Short-Term Impoundment of Longshore Sediment Transport," U.S. Army Corps of Engineers, Coastal Eng. Research Center, Misc. Paper CERC-87-7, 345 pp.; March, 1987.
- Creed, C.G., Olsen, E.J., and Bodge, K.R., 1994. "Performance of an Interim Sand-Tightening Measure at an Inlet Jetty", Proc., Beach Preservation Technology '94, FSBPA, Tampa, FL.
- Bodge, K.R., "Performance of 1992/93 Nearshore Berm Disposal at Port Canaveral, FL", Proc., Beach Preservation Technology '94, FSBPA, Tampa, FL.
- Bodge, K. R., E. J. Olsen, C. G. Creed, 1993. "Performance of Beach Nourishment at Hilton Head Island, South Carolina", Proc., Eighth Symposium on Coastal and Ocean Management (Coastal Zone '93); New Orleans, LA July 19-23, 1993.
- Bodge, K. R. and E. J. Olsen, 1993. "The Environmental Permitting of the Wreck," in: *The Mapel Leaf; An Extraordinary American Civil War Shipwreck*, ed. by K. Holland, L. Manley, J. Towart; St. Johns Archaeological Expeditions, Inc., Jacksonville, FL.
- Bodge, K. R. and E. J. Olsen, 1992. "Beach Nourishment with Aragonite and Tuned Structures", Proc., Coastal Engineering Practice '92, ASCE, Long Beach, CA.; 73-90.
- Bodge, K. R. and R. J. Savage, 1992. "Inopportune Timing of Oceanfront Structures", Proc., Beach Preservation Technology '92, FSBPA, St. Petersburg, FL.
- Bodge, K. R., 1990. "Predicting Damage Benefits of Shore Protection Projects," Proc., 22nd Int. Conf. on Coastal Engineering; ASCE, Delft, The Netherlands; July, 1990.
- Bodge, K. R., 1990. "Refraction Analysis for Predicting Shoreline Response," Proc., Beach Preservation Technology '90 Conference; Fla. Shore & Beach Preservation Assn., St. Petersburg, FL.
- Bodge, K. R. and E. J. Olsen, 1989. "Navarre Navigation Project: Designing an Inlet for No Net Impact to Adjacent Shorelines," Coastal Zone '89, Charleston, S.C.; June, 1989.
- \*Bodge, K. R., 1989. "Try a Trick to Find a Reciprocal," *SAIL*, Vol. 20, No. 3, Sail Publications, 45-46; March, 1989.
- Bodge, K. R., 1989. "Deep Navigation Channels and Local Shoreline Erosion," Proc., Second Annual National Beach Preservation Tech. Conference, Fla. Shore & Beach Preservation Assn., Tampa, FL; February, 1989.
- Bodge, K. R., 1988. "Longshore Current and Transport Across Non-Singular Equilibrium Beach Profiles," Proc., 21st Int. Conf. on Coastal Eng., ASCE, Malaga, Spain, pp. 1396-1410.
- Bodge, K. R., 1988. "Offshore Sand Sources for Beach Nourishment in Florida: Part 1 - Atlantic Coast; Part 2 - Southwest Gulf Coast," Proc., National Beach Preservation Technology Conference, Fla. Shore & Beach Preservation Assn., Gainesville, FL; March, 1988.
- Bodge, K. R. and D. L. Kriebel, 1985. "Storm Surge and Wave Damage along Florida's Gulf Coast from Hurricane Elena," Proc., Ann. Conf., Florida Shore & Beach Preservation Assn., pp. 156-177.
- Bodge, K. R., 1982. "The Design, Development, and Evaluation of a Differential Pressure Gauge Directional Wave Monitor," U.S. Army Corps of Engineers, Coastal Eng. Research Center, Misc. Rpt. 82-11, 226 pp.; Oct 1982.