Careers that Float to the Top

Naval Architecture, and Naval, Marine and Ocean engineering are fast growing and dynamic fields with plentiful opportunities that are improving as people turn to the oceans for resources such as food, transportation and energy. These engineers must be creative and visionary to see the potential to use transportation and the oceans effectively. Government, industry and academia are hungry for experts and researchers to develop new processes and systems to explore and travel the ocean with minimal or no danger to its habitat and environment.

Marine structures, vessels and ocean systems are unique because only a small number of each design is built, they are very large and complex, and they operate in this environment. Anything that operates in this environment has special design requirements relevant to seakeeping, capsizing, station-keeping, and random motions and loads in a hostile environment. Due to this uniqueness, the manufacturing is often more challenging and expensive.

The impact of Naval architecture, Marine and Ocean engineering is far-reaching and greatly enhances our quality of life. For example:

- 74% of the world's trade is carried by ship.
- 95% of the U.S. international trade is transported by ship.
- 55% of the U.S. population lives within 50 miles of a coastline.
- 60% of the U.S. energy is imported by ship.

To learn more about these exciting careers, follow these links for more information:

www.seaperch.org
www.sname.org
www.onr.navy.mil
www.navalengineers.org
www.ndep.us
www.mit.edu

seaperch
TEACH · BUILD · BECOME

ONR
Office of Naval Research
Revolutionary Research ··· Relevant Results

THE SOCIETY OF NAVAL ARCHITECTS & MARINE ENGINEERS

Careers in Naval Architecture, Naval, Marine

&

Ocean Engineering

Naval Engineering

Naval engineers work on naval vessels. A naval vessel is one of the world's largest and most complex engineered systems. It's much more complicated to design a navy ship than almost any other form of transportation or structure. Not only is the ship critical to national defense but it has to move through the water similar to other boats and amphibious vehicles and enable a crew of hundreds to live aboard it for extended periods of time. Engineers in this field must always balance cost, new technology, hull design, materials and all of the systems aboard such as the weapons management, electronics, HVAC, propulsion, ventilation, sleeping quarters, galley, head, etc. The real trick for the Naval Engineer is to pull all of these pieces together.

Designing a Navy ship is similar to designing a high-speed floating city.

Naval Architecture

Naval architects are engineers who design all kinds of watercraft or anything that can be used as transportation on water. This may be a ship, boat, submarine, seaplane, icebreaker or offshore drilling platform. The vessels may be used for recreation, transportation, work or by the Navy and can be big or small. They may be powered by sails, nuclear power or some other propulsion system.

Marine environments can be hostile and unpredictable. One minute the seas are calm and the next can be a white knuckle ride as the waves pound the side of your boat or seagoing vessel. This unpredictability provides a challenging frontier for the naval architect.

A ship can move one ton of freight about 500 miles on a gallon of fuel.
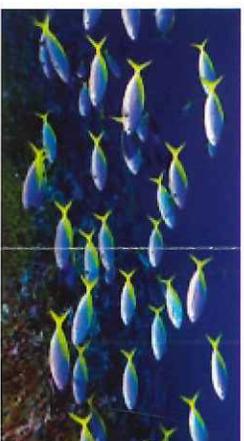
Marine Engineering

Naval architects may build the frame or structure of a boat but marine engineers are needed to design all of the internal power and machinery systems of the boat. Without marine engineers, the boat would have no engine, electronics, hydraulics, lighting, refrigeration, or controls.

To be a good marine engineer, you must be very versatile, creative and open to learning. Marine engineering is an exciting career because every boat or ship is different and you will be responsible for every system on board. Almost every boat needs an engine, propeller, steering, transmission, pumps, electrical systems, etc. Marine engineers make it happen. They know a lot about many different kinds of vessel systems and controls. They give millions of people the ability to have fun on jetskis, small sailboats, or vacation cruises as well as enabling the military to race across the oceans, clean oil spills or rescue other boaters in distress.

Marine engineers are responsible for designing hydraulic systems that can lift a 300lb Marlin out of the water!

They develop transportation systems, plan new uses for waterways, design deep-water ports, and integrate the land and water transportation systems and methods. They are concerned with discovering, producing, and transporting offshore petroleum as well as developing new ways to protect marine wildlife and beaches.

Ocean engineers develop instruments that can withstand intense pressure and darkness to discover new species of aquatic life miles below the ocean's surface.

Ocean Engineering

Every instrument, every device and every process in an ocean engineering is the creation and responsibility of ocean engineers. The ocean environment is very corrosive, volatile and often unpredictable. Waves are never-ending and the devices or gear that are used to explore the environment must be able to withstand high winds, waves and salt-water.

One of the great things about ocean engineering is that many different types of engineers can be a part of the solutions needed for ocean infrastructure, research and utilization. Ocean engineering integrates disciplines such as materials science and mechanical, civil, computer, software, marine, chemical and electrical and electronics engineering. In addition to creating underwater robots (ROV's), they also develop underwater structures, oil rigs, buoys for data collection, and they are hard at work developing ways to capture the energy of waves and turn it into electricity.