

Marine Engineering

STARTING SALARY (FOR MECHANICAL ENGINEERING): \$ 58,749

MEDIAN INCOME: \$88,100



Naval architects may design the frame or structure of a boat, but marine engineers design all of the internal power and machinery systems in the boat. Without marine engineers, the boat would have no engine, electronics, hydraulics, lighting, refrigeration, or controls. According to Jose Femenia, a professor of Marine Engineering at the United States Merchant Marine Academy,

“Marine Engineering is a very strong energy conversion discipline and very broad based. The subjects learned can be applied to shore side industries as well as the marine industry. I strongly recommend it, especially if you are interested in boats and/or ships.” Because most boats cannot be designed without regard to the control systems, marine engineers often work closely with naval architects.”

To be a good marine engineer, you must be 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 all happen. They understand the needs of the unique environment and know many different kinds of boating systems and controls.

Marine engineers determine and design different types of engines to propel a boat such as electric engines, diesel engines, steam turbines, water jets, gas turbines, and nuclear reactors. They also design hydraulic systems that can lift a 300 lb Marlin or crab nets out of the water for fishing boats, and the automated refrigeration systems for cruise lines or other pleasure yachts. Marine engineers may find themselves designing the electrical or fluid systems on an aircraft carrier, or the mechanical control systems on a tugboat or other bay-, lake-, swamp- or ocean-going vessel. There are almost no systems on a maritime vessel that they don't have a hand in designing.

Job Outlook

Employment of marine engineers and naval architects is projected to grow 10 percent from 2012 to 2022, about as fast as the average for all occupations. The need to design ships and systems to transport energy products, such as liquefied natural gas, across the globe will help to spur employment growth for this occupation.

Industries with the highest levels of employment in this occupation:

1. Architectural, engineering, and related services
2. Federal government, excluding postal service
3. Ship and boat building
4. Other professional, scientific, and technical services
5. Deep sea, coastal, and great lakes water transportation

Top paying industries for this occupation:

1. Federal government, excluding postal service
2. Architectural, engineering, and related services
3. Deep sea, coastal, and great lakes water transportation
4. Ship and boat building
5. Other professional, scientific, and technical services

Source: US Bureau of Labor Statistics

Marine engineers and naval architects may work on a ship at sea, in a shipyard, in factories where marine machinery is built, in design offices, in ship owners' offices, or for government agencies including military services.

Alan Rowen, technical director for The Society of Naval Architects and Marine Engineers (SNAME) and professor emeritus of marine engineering at the Webb Institute of Naval Architecture, explains that the sea-going engineers aboard ships tend to the operation and maintenance of the ship's machinery. They will also be responsible for the unlicensed crew working under their supervision. They may be in charge of an emergency team, damage-control team, or a life-boat. As the ship is traveling across the ocean, the sea-going, watch-standing engineer tends the machinery in the engine room of a ship for two, four-hour watches each day with eight hours off in between. They may use hand tools and machine tools, cutting and welding equipment, and machinery of all types—all while not getting seasick! In addition, computer skills are absolutely necessary. They must possess:

- Good mechanical aptitude,
- An ability to visualize systems in three dimensions,
- An ability to think things through in a logical manner,
- Good common sense,
- Persistence,
- Willingness to learn,
- An open mind, and
- An ability to clearly express ideas verbally, graphically, and in writing.

Sea-going marine engineers and naval architects, as well as those stationed overseas managing new construction or major repairs, may miss their family life at home, and a ship at sea can be dangerous and uncomfortable in heavy weather. On the other hand, sea-going engineers typically have more days off. Usually, for every seven days at sea, they may get four days at home. Whether they are in a shipyard or at sea, marine engineers and naval architects must be physically fit to meet the demands of the job.

LICENSES

There are a few types of licenses necessary to be a marine engineer.

1. Sea-going engineers start with a third assistant engineer's license, issued by the U.S. Coast Guard to those who meet the requirements of classroom instruction and practical experience aboard a ship. The exam may take several days to complete.
2. Many naval architects and marine engineers are licensed Professional Engineers, and some are certified marine surveyors.
3. Many marine engineers are sea-going marine engineers licensed by the U.S. Coast Guard or other national regulatory bodies.

When you think of marine engineers, think of them as the keymakers of the ship world. Without a key, you can't even get onboard and you certainly can't go anywhere. They give millions of people the ability to have fun on a Jet Ski, small sailboat, or vacation cruise, as well as enabling the military to race across the oceans, clean-up oil spills, and rescue boats in distress.

For more information about marine engineering and preparing to work as a marine engineer, visit the Society of Naval Architects and Marine Engineers at www.sname.org or pick up a copy of *The Maritime Engineer: Careers in Naval Architecture and Marine, Ocean and Naval Engineering*.

Glossary of Terms

Automate – to run or operate (something, such as a factory or system) by using machines, computers, etc., instead of people to do the work (merriam-webster.com)

Hydraulics – the science that deals with ways to use liquid (such as water) when it is moving (merriam-webster.com)

Maritime – of or relating to navigation or commerce on the sea (merriam-webster.com)

System – a group of related parts that move or work together (merriam-webster.com)

ABET Accredited Programs in Marine Engineering

School Name	Location	Website	Program and Degree Name
Maine Maritime Academy	Castine, ME, US	www.mainemaritime.edu	Marine Systems Engineering, BS
State University of New York Maritime College	Bronx, NY, US	www.sunymaritime.edu	Marine Engineering, BE
Texas A&M University at Galveston	Galveston, TX, US	www.tamug.edu	Maritime Systems Engineering, BS
United States Merchant Marine Academy	Kings Point, NY, US	www.usmma.edu	Marine Engineering and Shipyard Management, BS
United States Merchant Marine Academy	Kings Point, NY, US	www.usmma.edu	Marine Engineering Systems, BS