Mechanical Engineers

(0*NET 17-2141.00)

Nature of the Work

Mechanical engineers research, develop, design, manufacture, and test tools, engines, machines, and other mechanical devices. They work on power-producing machines such as electric generators, internal combustion engines, and steam and gas turbines. They also develop power-using machines such as refrigeration and air-conditioning equipment, machine tools, material handling systems, elevators and escalators, industrial production equipment, and robots used in manufacturing. Mechanical engineers also design tools that other engineers need for their work. The field of nanotechnology, which involves the creation of high-performance materials and components by integrating atoms and molecules, is introducing entirely new principles to the design process.

Computers assist mechanical engineers by accurately and efficiently performing computations, and by permitting the modeling and simulation of new designs as well as facilitating changes to existing designs. Computer-Aided Design (CAD) and Computer-Aided Manufacturing (CAM) are used for design data processing and for turning the design into a product.

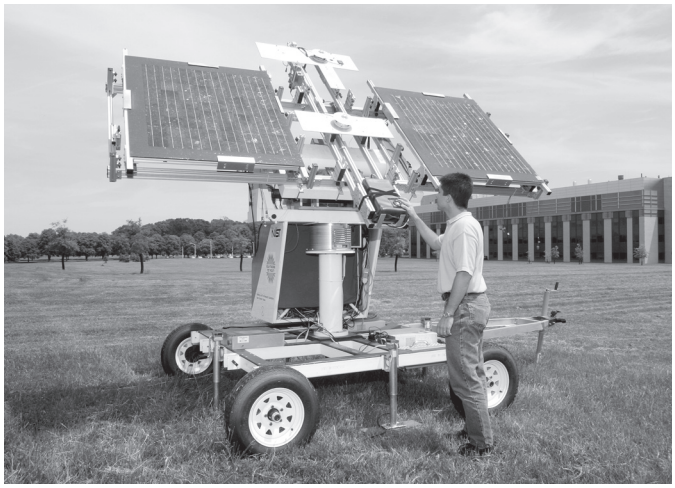
Mechanical engineers work in many industries, and their work varies by industry and function. Some specialize in energy systems; applied mechanics; automotive design; manufacturing; materials; plant engineering and maintenance; pressure vessels and piping; and heating, refrigeration, and air-conditioning systems. Mechanical engineering is one of the broadest engineering disciplines. Mechanical engineers may work in production operations in manufacturing or agriculture, maintenance, or technical sales; many are administrators or managers.

Employment

Mechanical engineers held about 215,000 jobs in 2002. More than half of the jobs were in manufacturing—mostly in machinery, transportation equipment, computer and electronic products, and fabricated metal products manufacturing industries. Architectural, engineering, and related services, and the Federal Government provided many of the remaining jobs.

Job Outlook

Employment of mechanical engineers is projected to grow more slowly than the average for all occupations though 2012. Although overall employment in manufacturing industries—where employment of mechanical engineers is concentrated—is expected to decrease slightly, employment of mechanical engineers in manufacturing should increase more rapidly as the demand for improved machinery and machine tools grows and as industrial machinery and processes become increasingly complex. Also, emerging technologies in biotechnology, materials science, and nanotechnology will create new job opportunities for mechanical engineers. Additional opportunities for mechanical engineers will arise because a degree in mechanical engineering often can be applied in other engineering specialties. In addition to job openings arising from growth, many openings should result from the need to replace workers who transfer to other occupations or leave the labor force.



Some mechanical engineers specialize in developing new energy systems.

Earnings

Median annual earnings of mechanical engineers were $62,880 in 2002. The middle 50 percent earned between $50,800 and $78,040. The lowest 10 percent earned less than $41,490, and the highest 10 percent earned more than $93,430. Median annual earnings in the industries employing the largest numbers of mechanical engineers in 2002 were:

Federal government	$72,500
Architectural, engineering, and related services	65,610
Navigational, measuring, electromedical, and control instruments manufacturing	65,430
Aerospace products and parts manufacturing	65,160
Other general purpose machinery manufacturing	55,850

According to a 2003 salary survey by the National Association of Colleges and Employers, bachelor's degree candidates in mechanical engineering received starting offers averaging $48,585 a year, master's degree candidates had offers averaging $54,565, and Ph.D. candidates were initially offered $69,904.

Sources of Additional Information

General information about mechanical engineers as well as information on careers, education, and training is available from:

➤ The American Society of Mechanical Engineers, 3 Park Ave., New York, NY 10016. Internet: **http://www.asme.org**

Information about heating, refrigeration, and air-conditioning engineering, a mechanical engineering specialty, is available from:

➤ American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc., 1791 Tullie Circle NE., Atlanta, GA 30329. Internet: **http://www.ashrae.org**

Information about automotive engineering, a mechanical engineering specialty, is available from:

➤ Society of Automotive Engineers, 400 Commonwealth Dr., Warrendale, PA 15096-0001. Internet: **http://www.sae.org**

See the introduction to the section on engineers for information on working conditions, training requirements, and other sources of additional information.