
Industrial Engineers, Including Health and Safety

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Nature of the Work

Industrial engineers determine the most effective ways to use the basic factors of production—people, machines, materials, information, and energy—to make a product or to provide a service. They are the bridge between management goals and operational performance. They are more concerned with increasing productivity through the management of people, methods of business organization, and technology than are engineers in other specialties, who generally work more with products or processes. Although most industrial engineers work in manufacturing industries, they may also work in consulting services, healthcare, and communications.

To solve organizational, production, and related problems most efficiently, industrial engineers carefully study the product and its requirements, use mathematical methods such as operations research to meet those requirements, and design manufacturing and information systems. They develop management control systems to aid in financial planning and cost analysis and design production planning and control systems to coordinate activities and ensure product quality. They also design or improve systems for the physical distribution of goods and services. Industrial engineers determine which plant location has the best combination of raw materials availability, transportation facilities, and costs. Industrial engineers use computers for simulations and to control various activities and devices, such as assembly lines and robots. They also develop wage and salary administration systems and job evaluation programs. Many industrial engineers move into management positions because the work is closely related.

The work of health and safety engineers is similar to that of industrial engineers in that it deals with the entire production process. Health and safety engineers promote worksite or product safety and health by applying knowledge of industrial processes, as well as mechanical, chemical, and psychological principles. They must be able to anticipate, recognize, and evaluate hazardous conditions as well as develop hazard control methods. They also must be familiar with the application of health and safety regulations.

Employment

Industrial engineers, including health and safety, held about 194,000 jobs in 2002. Six in 10 of these jobs were in manufacturing industries, and an additional 1 in 10 worked in professional, scientific, and technical services firms, many of whom provide consulting services to manufacturing firms. Because their skills can be used in almost any type of organization, industrial engineers are more widely distributed among industries than are other engineers.

Job Outlook

Overall employment of industrial engineers, including health and safety, is projected to increase as fast as the average for all occupations through 2012. In addition, many openings will be created by the need to replace industrial engineers who transfer to other occupations or leave the labor force. Employment of industrial engineers is expected to increase as fast as the aver-

age while that of health and safety engineers is expected to grow more slowly than average.

Because the main function of industrial and health and safety engineers is to make a higher quality product as efficiently and as safely as possible, their services should be in demand in the manufacturing sector as firms seek to reduce costs and increase productivity. The concern for health and safety within work environments should increase the need for health and safety engineers.

Earnings

Median annual earnings of industrial engineers were \$62,150 in 2002. The middle 50 percent earned between \$50,160 and \$75,440. The lowest 10 percent earned less than \$40,380, and the highest 10 percent earned more than \$90,420. Median annual earnings in the manufacturing industries employing the largest numbers of industrial engineers in 2002 were:

Semiconductor and other electronic component manufacturing	\$67,460
Navigational, measuring, electromedical, and control instruments manufacturing	65,470
Architectural, engineering, and related services	64,020
Aerospace products and parts manufacturing	63,630
Motor vehicle parts manufacturing	62,610

Median annual earnings of health and safety engineers were \$58,010 in 2002. The middle 50 percent earned between \$46,580 and \$71,980. The lowest 10 percent earned less than \$37,230, and the highest 10 percent earned more than \$87,250.

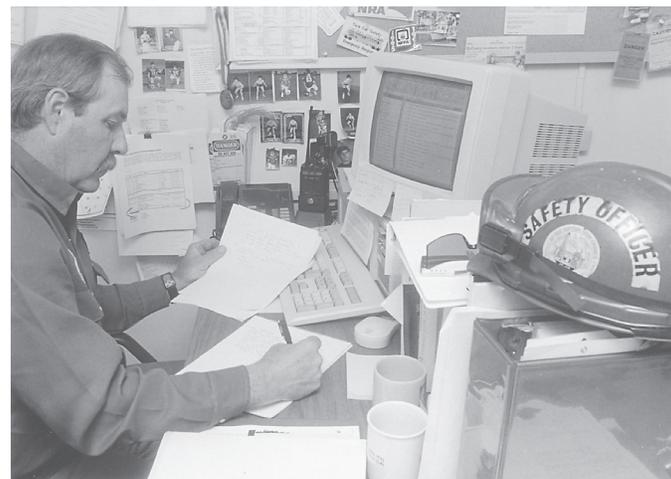
According to a 2003 salary survey by the National Association of Colleges and Employers, bachelor's degree candidates in industrial/manufacturing engineering received starting offers averaging about \$47,051 a year and master's degree candidates averaged \$54,565 a year.

Sources of Additional Information

For further information about industrial engineering careers, education, and training, contact:

► Institute of Industrial Engineers, 3577 Parkway Lane, Suite 200, Norcross, GA 30092. Internet: <http://www.iienet.org>

Information on careers, education, accreditation and certification, and salaries of safety engineers is available from:



Most industrial engineers work in manufacturing.

➤ American Society of Safety Engineers, 1800 E Oakton St., Des Plaines, IL 60018. Internet: <http://www.asse.org>

Information on certification, accreditation, careers, and safety-related degree programs for safety professionals, including safety engineers, is available from:

➤ Board of Certified Safety Professionals, 208 Burwash Ave., Savoy, IL 61874. Internet: <http://www.besp.org>

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