

How to Become a Civil Engineer About this section

Civil engineers need a bachelor's degree. They typically need a graduate degree and licensure for promotion to senior positions. Though licensure requirements vary within the U.S., civil engineers must usually be licensed in the locations where they provide services publicly.

Education

Civil engineers must first complete a bachelor's degree in civil engineering or one of its specialties. A program accredited by [ABET](#) is needed in order to gain licensure, which is required to work as a professional engineer (PE). In many states, a bachelor's degree in civil engineering technology will also suffice as an academic requirement for obtaining a license.

Bachelor's degree programs in civil engineering or civil engineering technology include coursework in math, statistics, engineering mechanics and systems, and fluid dynamics, among other courses, depending on the specialty. Courses include a mix of traditional classroom learning, work in a laboratory, and fieldwork.

More than one of every five civil engineers has a master's degree. Further education after the bachelor's degree is helpful in getting a job as a manager, along with the PE license and previous experience. For more information on engineering managers, see the profile on [architectural and engineering managers](#).

Important Qualities

Decision-making skills. Civil engineers often balance multiple and frequently conflicting objectives, such as determining the feasibility of plans with regard to financial costs and safety concerns. Urban and regional planners often look to civil engineers for advice on these issues.

Leadership skills. Civil engineers take ultimate responsibility for the projects or research that they perform. Therefore, they must be able to lead [surveyors](#), [construction managers](#), [civil engineering technicians](#), and others to implement their project plan.

Math skills. Civil engineers use the principles of calculus, trigonometry, and other advanced



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topics in mathematics for analysis, design, and troubleshooting in their work.

Organizational skills. Only licensed civil engineers can sign the design documents for infrastructure projects. This makes it imperative that civil engineers be able to monitor and evaluate the work at the job site as a project progresses to assure compliance with design documents.

Problem-solving skills. Civil engineers work at the highest level of planning, design, construction, and operation of multi-faceted projects or research with many variables that require the ability to evaluate and resolve complex problems.

Writing skills. Civil engineers must be able to communicate with other professionals, such as architects, landscape architects, and urban and regional planners. This means that civil engineers must be able to write reports clearly so that people without an engineering background can follow.

Licenses, Certifications, and Registrations

Civil engineers who sell their own services publicly must be licensed in all states and the District of Columbia. A license is required to exercise direct control of a project and to supervise other civil engineers and [civil engineering technicians](#). A degree from an [ABET](#)-accredited program in civil engineering or civil engineering technology is generally required to obtain a license.

Early in the licensing process, a civil engineer must take and pass the Fundamentals of Engineering (FE) Examination. After passing this exam and meeting a particular state's requirements, an engineer then becomes a Civil Engineering (CE) Intern or an Engineer-in-Training (EIT). Afterward, depending on the state, civil engineers must have a minimum of experience, pass more exams, and satisfy other requirements to qualify as a CE Professional. Each state's licensure board for professional engineers, which can be found through these [state societies of professional engineers](#), can give further details.

Advancement

Civil engineers with ample experience may move into senior positions, such as project managers or functional managers of design, construction, operation, or maintenance. However, they would first need to obtain the Professional Engineering (PE) license, because only licensed engineers can assume responsibilities for public projects.

After gaining licensure, credentialing that attests to a Professional Engineer's expertise in a civil engineering specialty may be of help for advancement to senior technical or even managerial positions.

