WHAT CAN I DO WITH A MAJOR IN … CIVIL ENGINEERING

OCCUPATIONAL SUMMARY:
Perform engineering duties in planning, designing, and overseeing construction and maintenance of building structures, and facilities, such as roads, railroads, airports, bridges, harbors, channels, dams, irrigation projects, pipelines, power plants, water and sewage systems, and waste disposal units. Includes architectural, structural, traffic, ocean, and geo-technical engineers.

EMPLOYMENT REQUIREMENTS:
Considerable Job Preparation Needed
A bachelor's degree is the minimum formal education required. However, many employers also require graduate school and some require a Ph.D., M.D., or J.D. (law degree).

EMPLOYERS & SUGGESTED STRATEGY:
Please ask your Career Advisor (CDF) for identifying employers or additional resources for your occupation of choice.

Construction industry - Consulting firms - Engineering or architectural firms - Manufacturing companies - Oil companies - Railroads companies - State and federal government agencies - Telecommunications businesses - Utility companies

Suggested Strategy: Learn to work well within a team. Develop strong communication and interpersonal skills. Develop physical stamina for outdoor work. Get experience in organizing and directing workers and materials. Ability to visualize objects in three dimensions is helpful. Demand has remained steady due to broad nature of discipline. States may require licensing or registration.

A DAY IN THE LIFE:
“If you’re the type of kid who built whole cities out of blocks in his bedroom, look into civil engineering.” Civil engineers build real cities, from roads and bridges to tunnels, public buildings, and sewer systems. Projects have three phases: preconstruction planning, implementation, and infrastructure maintenance. The preconstruction phase involves surveying land, reviewing plans, assessing funding and needs, then making decisions about schedule, materials, and staffing. Most work is done indoors during this phase. Implementation is where construction begins, and many civil engineers spend considerable time on-site reviewing progress and coordinating all construction. One engineer said, “Sometimes you live out there for two or three days at a time.” Problems must be solved on the spot, and civil engineers are the only ones with the knowledge and responsibility to do so. Infrastructure maintenance, which includes stress tests, evaluations, and on-going support, takes place after construction is finished. Civil engineers move back to their offices to wrap up all paperwork and make all final adjustments to the project. Then it is time to start the process again. Civil engineers work hard. Hours can be long, government funding cuts can destroy a project, deadlines are firm, and weather can throw projects off schedule. If the timetable degenerates, an engineer has to overcome scheduling obstacles with ingenuity. Nearly all our surveys mentioned creativity as the first or second most important trait a civil engineer can have. About half of all civil engineers are employed by federal, state, or local governments, which means they must be ready for bureaucratic delays, political stalls, and lots and lots of paperwork. Though civil engineers don’t know where or when their next project will be, this doesn’t seem to faze them. “Projects can last up to ten years, so it’s not exactly like you’re moving every week,” said one engineer we spoke with. Satisfaction is strong; most wouldn’t trade their occupation for any other.

PAYING YOUR DUES:
Civil engineers must have an engineering degree from a school accredited by the Accreditation Board for Engineering and Technology and three to four years of work experience. They also must pass a state-sponsored Professional Engineer examination. Many civil engineers find it helpful to join a professional association, such as the American Society of Civil Engineers (ASCE).

Tasks • KNOWLEDGE • SKILLS • ABILITIES

• Analyze survey reports, maps, drawings, blueprints, aerial photography, and other topographical or geologic data to plan projects.
• Plan and design transportation or hydraulic systems and structures, following construction and government standards, using design software and drawing tools.
• Compute load and grade requirements, water flow rates, and material stress factors to determine design specifications.
• Inspect project sites to monitor progress and ensure conformance to design specifications and safety or standards.
• Direct or participate in surveying to lay out installations and establish reference points, grades, and elevations to guide construction.
• Provide technical advice regarding design, construction, or program modifications and structural repairs to industrial and managerial personnel.

Knowledge

**Engineering and Technology** — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to design and production of goods and services.

**Design** — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.

**Mathematics** — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

**Building and Construction** — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.

Skills

**Mathematics** — Using mathematics to solve problems

**Critical Thinking** — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

**Science** — Using scientific rules and methods to solve problems.

**Active Listening** — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

**Reading Comprehension** — Understanding written sentences and paragraphs in work related documents.

**Active Learning** — Understanding the implications of new information for current and future problem-solving and decision-making.

**Complex Problem Solving** — Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.

Abilities

**Deductive Reasoning** — The ability to apply general rules to specific problems to produce answers that make sense.

**Oral Expression** — The ability to communicate information and ideas in speaking so others will understand.

**Problem Sensitivity** — The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

STATE & NATIONAL WAGES (2007):

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STATE & NATIONAL EMPLOYMENT TRENDS:

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INFORMATIONAL WEBSITES:

online.onetcenter.org/ | www.acinet.org/ | www.princetonreview.com