



CIVIL ENGINEERING TECHNOLOGY



Bryant Kesler describes Geocaching, a high-tech treasure hunting game using GPS devices. He is a 2009 graduate of the Tech Prep CAD (Computer Assisted Drafting) program at Apollo Career Center. "The CAD program at Apollo is coordinated with the degree at Rhodes State College for Civil Design Engineering. I received credits by taking the CAD class, which saved me money when I started college," Bryant commented. He also received the \$2,000 Tech Prep scholarship from Rhodes State College.

Civil Engineering Technicians help Civil Engineers plan and build highways, buildings, bridges, dams, wastewater treatment systems, and other structures, as well as do related material testing and computer mapping. Some estimate construction costs and specify materials to be used, and some may even prepare drawings or perform land-surveying duties. Others may set up and monitor instruments used to study traffic conditions. Engineering technicians use the principles and theories of science, engineering, and mathematics to solve technical problems in research and development, manufacturing, sales, construction, inspection, and maintenance. Their work is more limited in scope and application-oriented than that of scientists and engineers. Many engineering technicians assist engineers and scientists, especially in research and development. Others work in quality control, inspecting products and processes, conducting tests, or collecting data

Engineering technicians who work in research and development build or set up equipment; prepare and conduct experiments; collect data; calculate or record results; and help engineers or scientists in other ways, such as making prototype versions of newly designed equipment. They also assist in design work, often using computer-aided design and drafting (CADD) equipment.

A Civil Engineering Concrete Technician is a person that possesses knowledge of properties of aggregates, construction practices, inspection and test methods, pavement design and estimating. They are also prepared to work in the public or private sectors as inspectors, testing technicians, quality control personnel, supervisors and managers. A Concrete Technician should also have the experience required

to sit for and successfully pass the Ohio Ready Mixed Concrete Association (ORMCA) certification test for Concrete Mix Designers. Furthermore, concrete technicians should become certified to test concrete by the American Concrete Institute (ACI).

Surveyors, cartographers, and photogrammetrists are responsible for measuring and mapping the earth's surface. Traditionally, surveyors establish official land, airspace, and water boundaries. They write descriptions of land for deeds, leases, and other legal documents; define airspace for airports; and take measurements of construction and mineral sites.

There is more to surveying and cartography than meets the eye. Chains, transits, theodolites, and plumb lines have given way to cutting-edge technology such as the Global Positioning System (GPS), laptops, and robotic total stations as the preferred tools of surveyors. Advanced computer software known as Geographic Information Systems (GIS) have become an invaluable tool to both surveyors and cartographers.

The GIS Technician is a person with training and/or experience necessary to assist professionals in local government agencies as well as private civil and architectural engineering firms. Geographical Information Systems and Global Positioning Systems technologies are exploding in applications for corrections/law enforcement officials, soil conservation and agricultural groups, utility and municipality infrastructure organizers and planners, transportation routers and trackers, emergency responders, and professional researchers. GIS graduates have significant employment potential both regionally and nationally.

SKILLS REQUIRED

Engineering Technologists must have application-oriented scientific and mathematical backgrounds as well as creative minds. Most engineering technologists are requiring the use of the computer to some degree. Land Surveying Technicians should have the ability to visualize objects, distances, sizes, and abstract forms. They must work with precision and accuracy, because mistakes can be

costly. Members of a survey party must be in good physical condition, because they work outdoors and often carry equipment over difficult terrain. They need good eyesight, coordination, and hearing to communicate verbally and manually (using hand signals). Surveying is a cooperative operation, so good interpersonal skills and the ability to work as part of a team is important.

WHERE/HOW TO GET TRAINING

Schooling

Engineering technicians are usually trained in two years. In some cases it is best for students to enroll in career center tech prep programs to get a head start in their profession. Engineering technology associate degree programs are found in many technical and community colleges. Many associate degree programs are offering internship opportunities as part of the college experience. There are many opportunities for associate degree graduates to enroll in 2+2 programs at colleges and universities with engineering technology bachelor degrees. Students with the mathematics aptitude can move onto traditional engineering

degrees after two-year degrees. High school students interested in pursuing a career in engineering technology should take as many science and math classes as possible.

Financial Aid

Grants, scholarships, loans, and work/study programs are available for college students. For most of this aid, high school seniors must submit a Free Application for Federal Student Aid, which is available from high school guidance offices and higher education financial aid offices. For more information on federal financial aid programs, or to apply electronically, visit the U.S. Department of Education's Web site at <http://www.ed.gov>.



For more information on federal financial aid programs, call (800) 4FEDAID

WORK ENVIRONMENT

Civil Engineering Technicians and Land Surveying Technicians usually work an 8-hour day, 5 days a week, and may spend a lot of time outdoors. Sometimes they work longer hours during the summer, when weather and light conditions are most suitable for fieldwork. Seasonal demands for longer hours are related to demand for specific surveying services. For example, construction-related work may be limited during times of inclement weather and aerial photography is most effective when the leaves are off the trees.

Technicians engage in active, sometimes strenuous, work. They often stand for long periods, walk considerable distances, and climb

hills with heavy packs of instruments and other equipment. They also can be exposed to all types of weather. Traveling is sometimes part of the job, and land surveyors and technicians may commute long distances, stay away from home overnight, or temporarily relocate near a job site.

Although Civil Engineering Technicians and Land Surveying Technicians can spend considerable time indoors while planning surveys, searching court records for deed information, analyzing data, and preparing reports and maps, cartographers and photogrammetrists spend virtually all of their time in offices using computers and seldom visit the sites they are mapping.

RESOURCES - HOW TO FIND OUT MORE

- American Congress on Surveying and Mapping <http://www.acsm.net>
- American Society of Engineering Education <http://www.asee.org>
- National Society of Professional Surveyors <http://www.acsm.net/nsps>

- American Association of Geodetic Surveying (AAGS) <http://www.acsm.net/aags>
- ASPRS: Imaging and Geospatial Information Society <http://www.asprs.org>
- Erik Robey, Chair, Civil Engineering Technology Rhodes State College 419-995-8071

FUTURE JOB OPPORTUNITIES

The field of Civil Engineering Technology is diverse and growing every day. Growth projections range anywhere from 10% to 30% by the year 2012 depending on which of the specific Civil Engineering Technology careers are sought. Employment of technicians in the fields of Land Surveying, Cartography and Photogrammetry is expected to grow as fast as average for all occupations through the year 2014.

JOBS IN THIS FIELD

Job titles	Salary range*
<i>Median annual earnings of manufacturing engineering technicians by specialty is shown in the following tabulation.</i>	
Civil Engineering Technicians	\$38,480
Surveying and Mapping Technicians	\$34,810
Cartographer and Photogrammetrists	\$46,080
Architectural and related services	\$37,470

*Salaries may vary depending on region and experience. Sources: Data is pulled from U.S. Department of Labor's Bureau of Labor Statistics

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