

Spotlight on Geotechnical Engineers



Stability, structure and integrity! These words describe the essence of geotechnical engineering and the professionals who work in it. Geotechnical Engineers determine the impact that geological formations may have on construction projects, ranging from drilling a well hole to preparing a structural foundation.

As a Geotechnical Engineer, you will use your advanced knowledge of scientific and mathematical processes to analyse and examine the formation of the earth beneath and around residential, commercial or industrial structures. You will apply these skills to drill wells, construct production and storage facilities, transport petroleum products and examine groundwater flow. This work has amazing possibilities, from marine operations off the east coast, to floating ice platforms in the Arctic, or the busy mining operations in the Alberta oil sands.

All this and more awaits you if you select a career in geotechnical engineering!



Inspecting the land.



What do Geotechnical Engineers do?

Geotechnical Engineers perform generalist and specialist functions within the framework of the following typical jobs:

- **Geotechnical or Geological Engineers (General):** Provide analysis and mapping of technical results obtained from seismic surveys. They also investigate subsurface conditions and materials to determine their properties and risks.
- **Geotechnical or Geological Engineer (Oil Sands Projects):** Design open pit walls, mine waste dumps and dam structures used in oil sands mining. They analyse slope stability, seepage and hydraulic separation on dam structures.
- **Hydrogeological Engineer:** Provide design and analysis of ponds containing discarded oil sands materials, water extraction from soil and sand, and steam injection into wells. They evaluate underground water layers trapped in rocks (aquifers). They also provide advice on environmental restoration.
- **Reservoir Geomechanics Engineer (Oil and Gas Operations):** Analyse the strength of soils, drill hole stability, stress constraint, permeability of rock formations, and the degree of trapped hydrocarbons in underground reservoirs.
- **Geomechanics Engineers (Marine Operations):** Analyse the relationship between physical structures and marine geology, anchoring systems, sediment erosion, slope stability, and foundations for offshore and coastal structures.



How do I become a Geotechnical Engineer?

You will need a four year Bachelor of Science degree from an accredited college or university. You can choose from a variety of engineering disciplines which include civil/structural, computer process control, geological, mine, and ocean and naval architecture.

You will also need a license to practice as an engineer. Provincial engineering associations are responsible for administering and issuing licenses. For more specific information about engineering qualifications and professional certifications, check out the following website: www.engineerscanada.ca.

For additional information on working as a Geotechnical Engineer, visit www.apegga.org.



Open pit mining at the Alberta oil sands. Courtesy of Suncor Energy.



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What are the working conditions like?

Geotechnical Engineers spend most of their time working in comfortable office settings. They occasionally visit operation sites such as production platforms off the East Coast, floating ice platforms in the Arctic, oil sands projects in northern Alberta, or drilling sites on the prairies. When visiting these sites, you could be exposed to potentially hazardous conditions and inclement weather. Safety protocols are strictly adhered to. Extended visits do occur and on occasion relocation may be required.



A team of Engineers reviewing marine drilling platform plans.



Do I fit the bill?

Do you think you have what it takes to become a Geotechnical Engineer?

- I am interested in geology, applied mathematics, and the basic laws of physics and chemistry.
- I am creative, imaginative and consider myself an idea person.
- I am good at clearly explaining technical things to others.
- I pay special attention to detail and accuracy and am not easily distracted.
- I am a good problem solver and think quickly on my feet.
- I am a great multi-tasker.
- I have an aptitude for using specialized computer software.
- I am interested in pursuing a university education that may require at least four or more years of study.
- I am quite versatile and can work on my own or with a team.
- I have well developed communication and computer literacy skills.
- I am able to travel to and from work locations.
- I think a career as a Geotechnical Engineer is exciting and I'm up for the challenge and adventure!



Quick tips and next steps!

- Visit career fairs and talk to employers who offer jobs and careers in this occupation. Check with employment centres, educational institutions, newspapers, petroleum-related magazines and the internet for information on career fairs.
- Choose a university that offers co-op engineering programs. These programs combine academic classes with practical experience terms involving participating employers.
- Obtain employment with a construction company during your summer breaks from university.
- Review *Engineering Your Future – a Career Planning Guide in Engineering* at the Association of Professional Engineers and Geoscientists of Alberta website at: www.apegga.org.
- Check out the P-Eng website at www.peng.ca for helpful information, including a section for students and Frequently Asked Questions.
- Review the *Generation-E Career Launch Handout* located at www.generation-e.ca.

Want more info?

For information on other industry occupations check out www.careersinoilandgas.com.