THE CANADIAN GEOTECHNICAL SOCIETY
LA SOCIÉTÉ CANADIENNE DE GÉOTECHNIQUE

Some of the First Women in Canadian Geotechnique

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Introduction to Geotechnique?

During my BSc, I was mainly interested in hydraulic engineering. While working as a student intern on a large dam project, after helping with the design of the service spillway, I started helping with the design of the lock and had significant interaction with the geotechnical engineers. The design of large retaining walls for the locks, in particular, peaked my interest. This experience, and the excellent geotechnical professors I had at university, led me into the geotechnical field and the rest is history.

Other women in your classes?

Twenty-nine women out of 600 students started with me as undergraduates. However, only 11 women graduated and only a few of us continued in the work force. The percentage of women was higher in graduate school. I believe I was the first woman to receive a PhD in Geotechnical Engineering at the University of Alberta.

Difficulty getting your first job?

Not really. After I finished my BSc, I continued at the firm where I had been an intern. After graduating from both my MSc and my PhD, I was also fortunate to be offered good jobs.

My career focus?

My main areas of interest are dams, mining and natural slopes. Some interesting projects that come to mind are:

- Tucurui Dam (Brazil), one the first large dams in the Amazon region;
- several large oil sands tailings dams in Alberta on pre-sheared clay shale foundations and built with winter fills, lean oil sands fill and coke drains;
- the Travers Dam (Alberta) rehabilitation that included a forensic assessment of the dam design and construction (from the late 1940s/early 1950s), seismic upgrading and installation of a remedial internal filter using compact grouting;
- the Bennett Dam (British Columbia) sinkhole investigation;
- the Dickson Dam (Alberta);
- the Paracatu Mine tailings dam (Brazil); and
- recently, the Diavik Diamond Mine tailing dam in the Northwest Territories.

Education

- 1979 BSc from the University of Sao Paulo, Brazil; Civil Engineering
- 1983 MSc from the Catholic University of Rio de Janeiro; Geotechnical Engineering
- 1991 PhD from the University of Alberta; Geotechnical Engineering; my thesis involved the interface between hydraulics and geotechnique with the hydraulic deposition of granular materials for the design and construction of tailings dams.

Employment

- 1978-1984 Initially I worked with Themag Engineering, in Brazil, mostly related to hydroelectric projects. After my MSc, I worked both in South America and Africa with Geotecnica, another Brazilian company.
- 1991-present I joined Hardy BBT Ltd. based in Edmonton and worked there until 2013. Since then, I have worked with BGC Engineering Inc., also based in Edmonton. The consulting work has taken me to western and northern Canada, continental USA, Hawaii, Africa and all over South America.

Notable Achievements

- I believe I was the first woman to receive a PhD in Geotechnical Engineering at the University of Alberta.
- 1998 CGS RM Quigley Award, as a co-author of the best paper in the *Canadian Geotechnical Journal* in 1997
- 2010 Stanley Thompson Award from the Edmonton Geotechnical Society
- 2011 Distinguished Lecturer of the American Society of Civil Engineers/University of California, Berkeley.
- 2014 and 2016 CGS Certificates of Appreciation

Involvement with CGS and other organizations?

I have been a CGS member for many years and was Vice President Technical for 2 terms (2013-2016). I served on the executive of the Geotechnical Society of Edmonton from 1993-1997, and was President 1996-1997. In 1998, I was Technical Program Chair for the CGS Annual Conference in Edmonton.

I am also a member of the Canadian Dam Association. Over the years I have participated on various technical committees such as the 'Canadian Liquefaction Experiment', 'Seismicity of the Oil Sands Area', and 'Delicensing of Oil Sands Tailings Dams'.

Who were your mentors?

My principal mentors as an undergraduate were the senior engineers with the firm where I interned; in particular, Dr. Arsenio Negro had a significant influence in my career. Later, I had the privilege of having Dr. Norbert Morgenstern as my PhD supervisor. He has been a great mentor to me over so many years.

I find that by observing, asking questions and listening carefully, I have learned a great deal from drillers, equipment operators, technologists, construction foremen, senior engineers, colleagues and clients.

On being a woman in a man-dominated profession?

I have never focused on being a woman in our profession. Initially, there were definitely many challenges because people were not used to having women as part of the team. I found that by focusing on the technical work and not on people's reactions, the majority of the challenges resolved themselves once people started to know me and got used to working with a woman. After a while, I would become just one of the colleagues. I found that the very best people in our profession, from construction sites to boardrooms, don't have any issues working with a variety of people, and I have really enjoyed working with them.

Advice to other women?

In my view, it is most important to focus on your technical skills and engineering judgement, make the best of the opportunities that come your way, and develop good relationships. All of this helps you become a better professional and helps you enjoy your work.

Photographs

Angela with the Diavik Diamond Mine Review Board, NWT, in 2017

Angela, circa 2008