

## Geotechnical Instrumentation News

**John Dunicliff**

### Introduction

This is the thirty-sixth episode of GIN. I don't have any articles to share with you this time – there are a few in the pipeline, but none at the discharge end. How about sending an abstract to me? Guidelines for preparation of articles for GIN are on BiTech's web site, [www.bitech.ca](http://www.bitech.ca).

### Abandoning Instruments in Dams

Jim Cassie of BGC Engineering Inc. in Calgary, Alberta sent me an item for publication in GIN, asking readers to share experiences and opinions on abandoning instruments in dams. I thought that a better forum for this topic would be the discussion page of [www.fmgm.no](http://www.fmgm.no) – by the time you read this the topic will have been posted there.

After introducing the issue, and telling about his own experience (including the case of a sinkhole that appeared at an instrument riser pipe installed in W.A.C. Bennett Dam in British Columbia), Jim asks:

1. *Have any other instances of sinkholes, piping or dam failures been traced back to some form of instrumentation within a dam?*
2. *If so, has there been any correlation made with regards to the type of instrumentation (e.g. standpipe piezometer), to the materials in which the instrumentation was installed or the hydraulic gradients proximal to any problematic instrumentation?*
3. *Are there any currently accepted "best practices" with regards to the*

*installation of instrumentation in dams and could these serve as the benchmark to compare previous installation procedures?*

4. *Are there any published guidelines or protocols that are available with regards to the liability assessment of abandoned instruments and further, any published procedures for proper abandonment of various sorts of instrumentation?*

I hope that you'll visit the web site and contribute to the discussion.

### Update on Grout et al

In a previous GIN column I told about four efforts related to backfilling of boreholes. Here's an update.

1. Guidelines for backfilling boreholes with grout. Erik Mikkelsen's article in December 2002 GIN, "Cement-Bentonite Grout Backfill for Borehole Instruments" provides detailed practical guidelines. If you want to read this, and can't find the magazine, you can request a pdf file of the article from Erik – [mikkelsen.pe@comcast.net](mailto:mikkelsen.pe@comcast.net).
2. Installation of vibrating wire and pneumatic piezometers in boreholes, by grouting the entire borehole, i.e. no sand and no bentonite seal. This has become known as the *fully-grouted method*. Erik Mikkelsen and Gordon Green have written a paper for FMGM 2003, "Piezometers in Fully Grouted Boreholes", explaining and recommending the procedure. You can also request a pdf file of this from Erik.

3. Lab testing of cement-bentonite grouts, in various proportions, to determine strength, permeability, compressibility and volume stability. The test procedures have been agreed, and testing is expected to start during this summer.
4. Lab testing of bentonite chips and pellets, to determine which are most suitable for sealing piezometers in boreholes. This test program is nearly complete, and I expect that results will be reported in the December episode of GIN.

### How Accurate are Your Inclinometer Data?

To quote from Erik Mikkelsen's paper (see below), "The probe inclinometer is deceptively easy to use. Its use has become increasingly commonplace, yet there are fundamental misconceptions about the accuracy of the results. The data analyst must evaluate the error potential and screen the results for errors." I attended a symposium in April this year in London, *Symposium on Construction Processes in Geotechnical Engineering*, during which at least four speakers showed plots of inclinometer data that were clearly subject to errors, which emphasized to me that Erik's view is correct. He has written a paper for FMGM 2003, "Advances in Inclinometer Data Analysis", which describes the various sources of error and methods of correction. "Must reading" for many readers of GIN, I think! Again, a pdf file of the paper can be requested from Erik.



Doug Belshaw

**Doug Belshaw**

Jim Pianosi of Solinst Canada Ltd. has sent me the following tribute to Doug Belshaw.

*It is with great sadness that we pass on the news of the death of Douglas Belshaw, entrepreneur and proud President of Solinst Canada Ltd.*

*Doug was very well known and respected in the geotechnical and groundwater communities. He earned two degrees in Scotland, in mining engineering and geotechnology. He also took Ph.D. courses at the University of Illinois at Urbana-Champaign under the guidance of Ralph Peck, then spent two years in England, before returning to consulting in Ontario.*

*In 1982, Doug purchased Solinst, a small company that distributed geotechnical instrumentation, and began manufacturing groundwater instrumentation. During his ownership the company grew from 5 to almost 50 employees.*

*Doug moved Solinst Canada from its original location in Burlington, Ontario to larger premises in Glen Wil-*

*liams in 1989, then to their present plant in Georgetown, Ontario in 1994 - very appropriately, right beside the Georgetown water tower. He had planned an expansion to the existing premises, which now is underway.*

*Doug was an engineer par excellence, and worked on many breakthrough projects in his field. In the early 90s he was elected chairman of the Center of Excellence for groundwater research at the University of Waterloo: a prestigious achievement.*

*Doug Belshaw was a man of modesty, enthusiasm and vision, and will be dearly missed by his family, friends, staff and associates.*

**Language Problems**

I've now been back in the Mother Country for five years. I still have problems with the language. As an example, I was in a local pub and saw a man propping up the bar. I'd seen him several times at another pub, doing the same thing, and knew his name. So, just to be friendly, I went up to him and asked, "What are

*you drinking Michael?" He replied, "I'll have a half of bitter please." Do you get it? I just wanted an answer to my question, but the question means something else in English English! I'm on a long learning curve.*

**Closure**

Please send contributions to this col-

umn, or an article for GIN, to me as an e-mail attachment in MSWord, to [johndunncliff@attglobal.net](mailto:johndunncliff@attglobal.net), or by fax or mail: Little Leat, Whisselwell, Bovey Tracey, Devon TQ13 9LA, England. Tel. and fax +44-1626-832919.

Sláinte! (Ireland)