

The Grout Line

Paolo Gazzarrini

Overture

...and here we are! Not yet “buried” with material, but here for our quarterly appointment. I have not yet received a whole lot of articles or comments to be published and I hope it is only because there was a very short time between the publication of the first presentation of this new department and the deadline to receive the material. But I am still optimistic and I am still waiting to hear from you.

The first comment is about my name: due to a misunderstanding my last name was misspelled. The correct spelling is GAZZARRINI with double Z and double R. ...But, no problem, it is not an easy name and during my extensive trips around the world I have had proof of that...I have had numerous cases of funny (for me) spellings including a “triple N”...someone on that occasion thought well to be sure to add a couple more “N”’s !!!!! “Gazzorini” is a new version to add to my list!

“Listen To The Driller”

The first contribution to “The Grout Line” is from John Dunicliff. Not happy about the amount of work that he is doing for his Department, he additionally found the time to send me the following email.

Congratulations on the birth of The Grout Line! You said “I would like to be buried with material to be published” and I very much hope that you will. [Thanks John, I think]

I have one small contribution - the story isn’t worth anything, but the “lesson learned” is. This was in Kurdistan, Iraq (Dokan Dam) many years ago (around 1955). A 380-ft high concrete

arch dam on limestone, with the inevitable solution cavities. An extremely comprehensive grout curtain, with primary, secondary and tertiary holes, and many thousands of Lugeon tests (do I remember the name correctly? Tests under water pressure to determine flow, then something called a *Lugeon coefficient* I believe). All was complete, a PhD thesis written by the engineer in charge of the grouting, and the reservoir started to fill. And, horror of horrors, springs started to appear in the valley just downstream of the dam! Back to the drawing board and all the grouting

records, searching for a possible hole in the grout curtain, and each of us supposed engineers said, “there”. So we took it in turns to dictate the alignment of the drill rods in the grouting gallery. No luck! All Lugeon tests good. Eventually the driller said, “let me have a try”. He found it first time! And now to the lesson - we may think we have expertise because we have some academic and/or licensed credentials - but, **Listen to the Driller!**

John Dunicliff

do not print keylines

Moore & Taber

b & w

NEW

Friesens has pdf

Thanks John for your contribution! These few words from John give me the opportunity to comment on some aspects of drilling and grouting for the grout curtain of a Dam and more generally about some points of grouting.

The first point is the “lesson learned” and the people working in drilling/grouting. Drilling and grouting is not an easy nor a comfortable job! Often in the mud, working outside with all kinds of weather, hot, cold, rainy etc. (the dams usually are not in very comfortable places), splashed by grout mix etc.

These interesting characters (drillers and grouters), working constantly in direct contact with the rock/soil, have for sure the best “feeling” of what is happening during the drilling and grouting operations.

Absolutely it is not wrong for the “supposed Engineers” to talk more often with the drillers and grouters, gaining insight from their comments. I don’t believe the Engineer’s “prestige” and reputation shall be affected! John, I think it was a good lesson!

The second point I would like to introduce here is the use of computers during the drilling and grouting operations in all kinds of grouting work, but especially in grouting for new dams or dam rehabilitation, in which the grouting activity can be of dimensions that justify additional expenses for the use of the computers. (My personal prefer-

ence is to try to use them independently from the job dimensions and/or the additional costs!).

The dam that John is talking about was constructed in the middle 50’s. The use of the computers in grouting started around the beginning of the 80’s. Could the “partial failure” with leakage, described by John, have been avoided using the computers?

Another point (and I want introduce this as a provocative comment) is the LUGEON tests that John introduced in his testimonial. [Yes, John, the name is correct but more than Lugeon coefficient it is called Lugeon Unit (UL)... very small details!].

John wrote: “An extremely comprehensive grout curtain, with primary, secondary and tertiary holes, and many thousands of Lugeon tests... and a lot of money! Is the Lugeon test still the best way to evaluate a residual permeability? Is it the cheapest way to control the result of the grouting? We must consider that the Lugeon test is carried out with water with very different characteristics (density, viscosity, cohesion etc) from any kind of grout mix used during the grouting process.

Some authors consider the Lugeon test obsolete, not practical, expensive and not representative for the control of the grouting; some other authors have introduced new concepts such as “equivalent Lugeon” or “apparent

Lugeon”.
Comments?
Discussion?

Topic for Discussion – Grout Mixes

It would be interesting, on these pages, to start also some discussion regarding grout mixes and the various opinions between us.

As an example, for grouting in rock, one of the eternal discussions has been “thin mix” or “thick mix”?

Compaction grouting, what is the best “low mobility grout” to use?

Any experiences about new chemical grout mixes or additives for simple water/cement based grout mixes? The chemical industry is always in continuous evolution and new additives can be found on the market.

Any comments? Case histories regarding this point?

Clarification

Some synonyms of one acronym that is widely used in our industry:

1. GIN = Geotechnical Instrumentation News
2. GIN = Grouting Intensity Number (grouting method used quite often in rock grouting)
3. GIN = better if associated with Tonic

Conclusion

This first “real” issue of the Grout Line begins with this short article. I would like to avoid bothering you with my material, so let your creative juices flow and send me your stuff!

It has been brought to my attention that some of you had troubles in sending email to me. Another email address that you can use is *paologaz@shaw.ca* or *paolo@paologaz.com*.

Waiting to hear from you! Ciao.

*Send your contributions to: The Grout Line, Paolo Gazzarrini, 12 – 2242 Folkestone Way, West Vancouver, BC V7S 2X7,
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