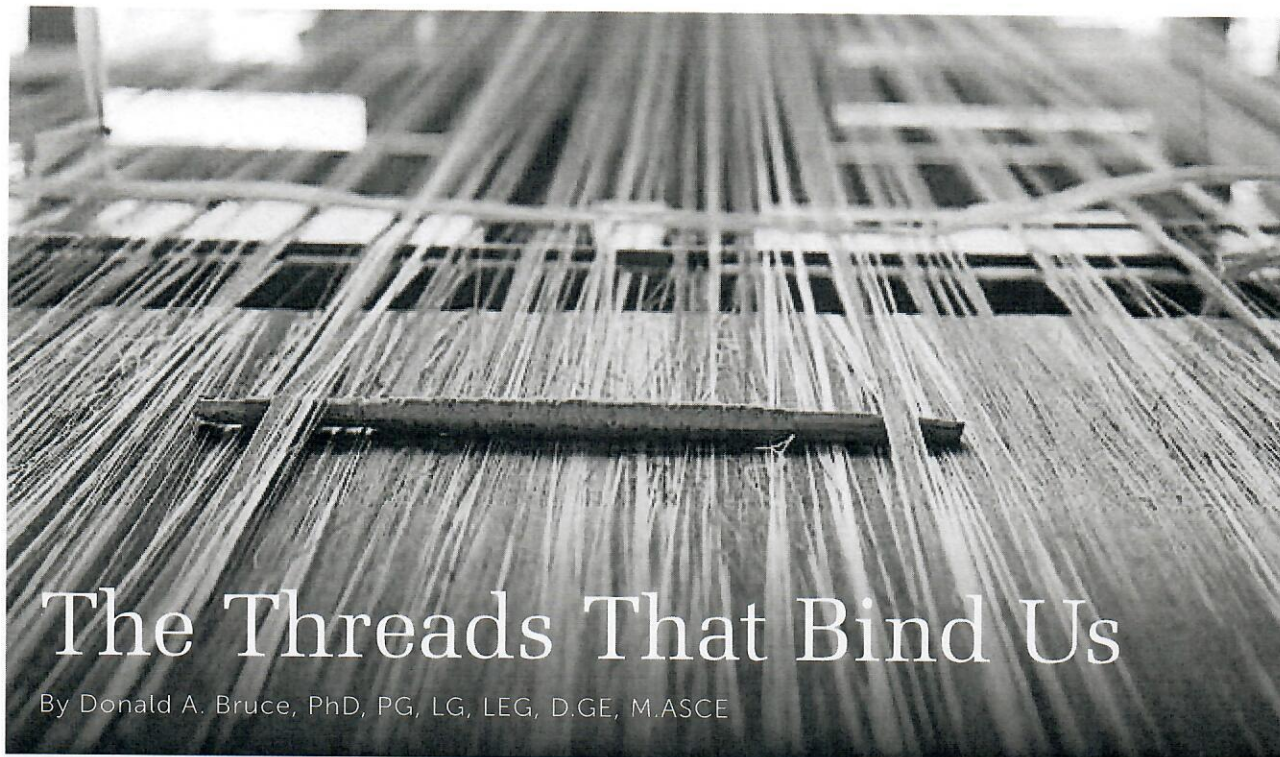




The Threads That Bind Us

By Donald A. Bruce, PhD, PG, LG, LEG, D.GE, M.ASCE

Treatment of rock and soil by grouting is a specialty geotechnical construction technique that is standard practice in foundation engineering. Just as the range of applications is wide, so, too, the actual grouting techniques are numerous and diverse. Depending on soil type and project goals, techniques range from permeation with a wide variety of grouts (from cementitious suspensions, through colloidal suspensions, to true solutions) to compaction grouting

using limited-mobility grout, and jet grouting with its high erosive energy concepts. Then there's compensation grouting, the most recent addition to the stable, that's rapidly becoming a favored technique for tunnellers in soft ground in urban areas. For treating rock masses, grout can be used to seal fissures and to cement the ground together, while different techniques and materials are required to seal large voids, such as solution features (karst) or abandoned mine workings.

The wide world of grouting often gives the impression of being bound together by a common "fraternity/sorority" that transcends competition, employers, and philosophical differences of opinion. This mythical free masonry encompasses all grouters, from professional engineers with highly sophisticated design, control, and analytical capabilities, to the operators working on the backshift in dark and wet tunnels and shafts, and crews slabjacking on domestic driveways.

Yet how strong are the threads that bind us? How strong do these threads need to be, and how strong *can* they be? In considering my own experiences, my responses to these questions are, respectively: "weak," "not required," and "not very." I believe that the diversity of applications, techniques, capabilities, and philosophies trumps the concept of some type of "grouter's union." For example, we cannot agree if it's best to use Apparent Lugeon Theory (as used on most USACE major dam remediation projects for some 20 years now) or GIN Theory (developed almost 40 years ago to simplify and regularize grout injections) for rock-mass grouting. Worse, there are disturbing signs in the industry of retrogressive steps such as a return to (unstable) neat grout mixes with high water contents to make them "thin," and the demeaning of the value of computerized control and analysis systems.

The Ties That Bind

What, therefore, can we do to raise standards and strengthen the "team grouting" concept? Arguably, the most potent initiative has been the ASCE/Geo-Institute grouting conferences. Beginning in 1982, the successive meetings in 1992, 2003, 2012, and 2017

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have provided a wonderful platform from which to share experiences and promote “best practices” in all types of grouting. The more recent conferences have also covered deep mixing and diaphragm walls, subjects related to grouting by technique or application. It’s also common to find sessions in annual conferences organized by professional and trade associations featuring grouting, especially for dams and tunnels. The activities of “grouting committees” in these associations must not be overlooked.

“Guideline” documents covering specific techniques are particularly valuable, constituting a referenceable standard of care in the absence of rigorous standards. Manuals prepared by federal agencies also set the tone, especially now that the lessons learned in the past 20 years have been

incorporated into updated versions of earlier works. Textbooks written by private authors tend to turn into statements of what the authors have personally done in the past, and despite being valuable historical records, start becoming obsolete within a few years after publication. Also, it’s doubtful if the messages contained in such textbooks are received by the large majority of the grouting profession: exactly the constituency who must be tied-in most effectively.

Short courses, such as that hosted annually by the University of Austin, TX, are an extremely efficient way of educating and influencing. However, these events can be somewhat of a double-edged sword. The good news is that the faculty is carefully chosen from industry champions who share their knowledge over several intense days

of interactive teaching. The bad news is that the courses are therefore somewhat costly (remember the experienced faculty?) and last several intense days (difficult for many to accommodate).

It’s therefore pragmatic to conclude that the diversity in the grouting community guarantees that there can rarely be uniformity of techniques, philosophies, and knowledge. However, regardless of process, application, or location, there are three threads that should bind the grouting community together: safety, quality, and ethics. Over the last 20 years or so, there have been remarkable improvements in attitudes toward personnel safety, ranging from mandatory personal protective equipment (PPE) requirements to “stretch and flex” sessions for all personnel to open the construction day. It’s wholly appropriate that a company’s safety statistics have become a prime determinant in proposal evaluation. Grouting is no longer a “black art.” It is, or should be, an engineered process whose quality can be provided with assurance. Little can be more effective in raising the profile of the grouting community: ethical behavior by all parties is equally a prerequisite of a putative admirable community.

Devotion to each of these three binding threads will encourage the right sort of person to want to join the community. Even more important, such devotion will encourage these newcomers to stay in the community, and so become the new generation of leaders in years to come. ■

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