



LOOKING TO THE FUTURE...

Our industry exists in a constant state of change, with mergers and acquisitions, new regulations, and technical innovations sprouting up across the globe. Schnabel is no exception to this rule of change, and although we consider ourselves a steady constant in the market, we recognize that change is necessary for growth and progress, and an imperative for us to serve our clients in the best possible manner.



Back in February, Schnabel's Board of Directors named Walter J. Rabe, P.E., President and CEO upon Gordon Matheson's retirement from the firm. Walt has been with Schnabel since 2001 and served as Branch Leader for our Sterling,

VA, office until 2012. He served as Executive Vice-President of Schnabel's Geotechnical Business Unit since that time. Walt has been very involved with the growth of the firm's international work, traveling to more than 60 countries in the past 15 years. Schnabel's Board of Directors are confident that Walt is the right person to continue guide the firm through the coming years.

Since then, we've been making some other organizational changes as well to better position our leadership to meet your needs and focus on the future of the markets that we serve. We thought you might like to know a little more about the new management team leading the charge.



Michael C. Canino, P.E. now serves as President of our Dam and Levee Engineering Services. Mike is responsible for the management, growth, and strategic direction of the firm's Dam and Levee Engineering Business Unit.

Mike has been with Schnabel since 2008 and served as Branch Leader for our West Chester, PA office. Mike has over 25 years of experience, specializing in geotechnical aspects of dam engineering.



Change is the law of life. And those who look only to the past or present are certain to miss the future.

John F. Kennedy

Preston J. Frey now serves as President of our Geotechnical Services and Eric B. Rehwoldt, P.E., P.G. now serves as Executive Vice President of Geotechnical



Services. Preston and Eric are responsible for the management, growth, and strategic direction of the firm's Geotechnical Engineering Business Unit. Preston has been with Schnabel since 1981 and most recently served as the President of our Dam Engineering Business Unit. Eric has been with Schnabel since 1996 and served as Branch Leader of our National Capital Office (comprised of our Rockville, MD and Sterling, VA office locations).



Finally, George R. Teetes, Ph.D., P.E. will lead our tunnel and underground practice as President of Tunnel Engineering Services. George is responsible for the management, growth, and strategic direction of the firm's

Tunnel and Underground Business Unit. George has been with Schnabel since 1996 (originally with Lachel & Associates before being acquired by Schnabel) and served as Branch Leader for our Dallas, TX office. George has over 25 years of experience, specializing in tunnel engineering.

Over time, your projects change, as do your demands from your engineering partners, and so we must look to the future to provide the best and brightest expertise to meet those challenges. By looking to the future and embracing our past, our new leadership is charged with Schnabel's growth and progress, with the ultimate goal of continual improvement and success for you and your projects. ■

Without continual growth and progress, such words as improvement, achievement, and success have no meaning.

Benjamin Franklin

AIR ENTRAINMENT OF GERCC DAMS

BACKGROUND

Since being introduced in the 1980s, roller compacted concrete (RCC) dam construction has provided substantial benefits to the dam industry in cost and speed of construction. Unfortunately, drawbacks of the construction technique can include seepage and poor freeze-thaw durability. One facing system that has been developed to solve this problem in climates not prone to freeze-thaw cycles is grout enrichment. However, techniques for reliably entraining air in GERCC to accommodate its use in climates subjected to frequent freeze-thaw cycles have proven elusive. Villanova University, in partnership with Schnabel Engineering, is conducting testing on an air entrained grout enriched facing system for RCC dams.

What does GERCC stand for?

Grout Enriched Roller Compacted Concrete.

What is GERCC?

Cement grout added to uncompacted RCC at each lift along the formed upstream face.

What is the benefit of GERCC?

After the grout has been applied to the RCC, immersion vibrators are used to mix and consolidate the grout and RCC to produce a seamless zone that mimics the consistency and behavior of conventional concrete.

Why isn't GERCC used all the time?

It has been fairly limited in the United States, primarily due to concern over an inability to effectively entrain air in the GERCC to provide freeze-thaw resistance.

LABORATORY TESTING

The laboratory testing consisted of three phases:

- Stability of air entrainment in grout with various chemical admixtures
- Evaluation of GERCC when grout and RCC are combined using a mixer
- Evaluation of GERCC produced using construction techniques that could be applied in the field

Properties measured at various stages include air content, freeze-thaw resistance, bleed, homogeneity of resulting GERCC and compressive strength.


The results show excellent freeze-thaw resistance for the GERCC created in a mixer. When the GERCC is created using field techniques, the freeze-thaw resistance is very dependent on the dosage and construction technique.

FIELD TRIAL

In order to test the construction methods and grout mixture developed during the laboratory testing, field trials were conducted by ASI Constructors, Bueno Vista, CO. The primary variables examined were the types and dosages of air-entraining and other admixtures supportive of reliable freeze-thaw resistance, the grout dosage and the amount of vibration used to consolidate the samples. Freeze-thaw resistance and the homogeneity from the full-scale field trial of cores are being evaluated, with interim results appearing to be very favorable.

Together...  **Schnabel** provided funding, RCC experts and specialized equipment.

 **VILLANOVA UNIVERSITY** provided research facilities and personnel, and mix design expertise.

 **ASI** provided field testing using prototype techniques.





Upcoming Events



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| Risk Management | Flooding & Hazard Assessment | Fish Passage | Sustainability |
| Regulation Structures | Flow Conveyance Structures | Environmental Impacts | Physical and Numerical Modeling |
| Coastal Shoreline Structures | Energy Dissipation | Sedimentation | Field Studies |

Keynote Presentations by:

- ICOLD President Prof. Anton Schleiss (EPFL)
- Prof. Vijay Singh (Texas A&M)
- Mr. Phil Burgi (retired, Reclamation)
- Mr. Thomas North (USACE)

Specialty Technical Session on Large River Basin Management by:

- US Army Corps of Engineers
- US Bureau of Reclamation
- Tennessee Valley Authority

Stepped Spillway Technical Workshop by:

- Prof. Hubert Chanson (University of Queensland)
- Dr. Sherry Hunt (USDA-ARS)

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Fort Collins, Colorado, USA

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Concrete Dams • Embankment Dams • Levees • Tailings Dams

This seminar will bring together leading experts from practice, research, development, and implementation for two days of knowledge exchange followed by a technical tour of the Colorado State University Hydraulic Laboratory with overtopping flume and wave simulator.