

### Schnabel to Present @ International Symposium on Hydraulic Structures



Dave Campbell, Schnabel's Director of Dam Engineering, is an invited keynote lecturer at the 4th International Symposium on Hydraulic Structures (Porto, Portugal; February 2012). Dave will speak on "Spillway Hydraulic Modeling – Personal Adventures and Peeks

Behind the Curtain." Discussion will include research-related experiences that helped to shape his perspectives. Dave will also present the case for improved communication and greater cross-discipline involvement between academia and practicing engineers to enhance the performance and cost effectiveness of spillway designs. Greg Paxson, a Principal in Schnabel's West Chester, Pennsylvania office, will present a paper entitled "Hydraulic Performance of Labyrinth Weirs for High Headwater Ratios" at the Symposium. Brian Crookston (also in the West Chester office) was the lead author, supported by co-authors Greg Paxson and Bruce Savage (Idaho State University).

### Crookston Publishes on Labyrinth Weirs

Brian Crookston has been notified by the ASCE Journal of Hydraulic Engineering that his paper entitled "Arced Labyrinth Weirs" has been accepted for publication. In addition, his paper entitled "Discharge Efficiency of Reservoir-Application-Specific Labyrinth Weirs" has been accepted by the ASCE Journal of Irrigation and Drainage. These papers, co-authored by Blake Tullis (Utah Water Research Laboratory), are based on research model studies performed by Brian as a doctoral candidate under Dr. Tullis.

### Schnabel on Faculty for USSD Workshop

Greg Paxson is an organizer and scheduled lecturer at a workshop on April 26 entitled Approaches to Meet Spillway Design Flood Requirements. The day-long training session is part of the USSD Annual Meeting and Conference to be held in New Orleans (4/23-4/27).

The **Water Wire** publications archive is available and can be downloaded at <http://www.schnabel-eng.com/Resources/WaterWire.aspx>



### From the Director's Chair

#### Giving as Receiving

As a Villanova University alumnus, I recently volunteered for a mentoring program for second year civil engineering students. The underlying requirement is for the mentor to respond to three sets of student e-mail questions during the semester. While students are given specific areas to explore with their mentor, the wording of their e-mail dialogue is to be independently developed by each student.

When asked to participate in the program, I thought "How painful could this be?" Now well into my first semester of involvement, I have found it to be a very positive outlet and one where I can help to make a real difference in a student's development – all from the comfort of my laptop.

Following is some background on how Villanova approaches the process. Each student is assigned a mentor for e-mail communications tied to a fall sophomore year course entitled Civil Engineering Fundamentals. The questions are designed to relate to course materials - some directly and some more tangentially.

To give you a feel for the program, my student's initial questions were:

- How did you choose Engineering as your undergraduate major in college?
- Do you find that your undergraduate engineering education prepared you well for your professional career?
- Is your career following a technical or a leadership / management path?
- As we begin our dialogue, can you offer some initial ideas or thoughts that might help me, as a college student, as I begin my engineering career?

About 90 minutes was invested in developing responses (a short paragraph to a long paragraph for each, as seemed appropriate). I was rewarded with a thoughtful return e-mail that followed up on my responses, showing that the student had indeed read and thought about the initial reply. In addition to some follow-up

questions, he added an additional question that I found intriguing in that it showed both initiative and insight:

*"Villanova offers a five year master's degree program. That is, stay a year after the 4 years of undergraduate education and they reward you with a masters degree. Seems too good to be true... What I'm concerned about is that maybe the 5 year masters program here doesn't hold as much value as pursuing a graduate program elsewhere upon undergraduate graduation (in the eyes of an employer). Do you have any insight you could offer me?"*

The second set of questions related to thoughts on group dynamics, effective teams and constructive management techniques. The professor for this class (Frank Falcone) is an old friend and a former associate, so I "peeked behind the curtain" to get an early heads-up that the last set of questions related to ethical behavior in the engineering profession.

What is important here isn't the responses provided, although I'd be happy to share them. The real importance is that our 'wired' world allows us to very conveniently touch other people's lives and make a meaningful difference. Giving back can't get much easier than this, and the benefits are very tangible in the development of young professionals that will soon be stepping into the working world to prepare themselves to take our places.

Our audience for the Water Wire is made of experienced individuals with unique perspectives, specialized expertise and valuable insights to share. I encourage each of you to explore opportunities for mentoring students either from your alma mater or a nearby school. If they don't have a mentoring program, encourage them to initiate one. This may not be a fit for everyone, but I have already found it to be highly rewarding both for me and my assigned student. Since the investment pretty much requires a few hours of focused attention over the course of a semester and provides a wealth of satisfaction, this commitment has become a no brainer to me. I hope it becomes so for others too.

Giving is getting so share your perspective - the insights provided are highly effective. The student is given a view from your station - the mentor is blessed with sincere appreciation.

# DEEP CREEK WATERSHED DAM 5D



## CONSTRUCTION

Foundation preparation for roller compacted concrete (RCC) dam construction on rock



Typical RCC placement



## Deep Creek Watershed Dam 5D

70 feet high and 1,500 feet long  
Client: Yadkin County, North Carolina

Schnabel was the principal designer of the recently completed Deep Creek Watershed Dam 5D. This dam is the largest and most complex of the 14 dams located along Deep Creek, completing a plan adopted in 1958 to control flooding in this area of Yadkin County, North Carolina.

The dam is a composite structure selected to efficiently make use of the complex existing foundation conditions, and was selected as being the least costly of 12 alternatives evaluated by Schnabel and reviewed by Yadkin County and the NRCS. However, designing both a large high hazard roller compacted concrete (RCC) gravity dam and zoned earth embankment on a variable foundation presented a considerable challenge. Particular attention was needed at the connection between the two dam types where differential settlement and seepage may occur. The Deep Creek project included the first use of grout enriched roller compacted concrete (GERCC) in the United States as the sole upstream barrier. This innovative process includes addition of a cement grout to the no-slump RCC at each lift along the upstream face, and then mixing the grout and RCC using hand held vibrators to consolidate the material and provide a seamless lower permeability zone of concrete.

This project was made possible through joint cooperation and funding that took more than ten years to obtain. The dam will provide safety to its residents because of the reduction of future flood damage to surrounding farms, homes and businesses. The design for a new park surrounding the reservoir is an extra bonus which will include a picnic shelter, fishing, boating and hiking trails. In addition, the dam included a raw water intake available for potential future water supply for the citizens of Yadkin County.



Aerial view of zoned earth embankment construction

