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Rusty Bascom: Underground Consultant

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Underground cable systems, particularly at transmission voltages, are becoming more important throughout the electric power industry because of difficulties with siting new lines along congested rights-of-way, according to Rusty Bascom, principal engineer at [Electrical Consulting Engineers, P.C.](#)

◆ Generally there is less opposition to building power circuits underground vs. overhead, so if a new circuit is being built, the underground alternative will at least have to be considered, ◆ Bascom said.

At the same time, according to Bascom, the engineering expertise for underground systems is fading away as more and more engineers retire.

◆ When I first started attending the Insulated Conductors Committee of the IEEE 20 years ago, I was one of the younger engineers in attendance, and we are just now starting to see some new faces show up at meetings, ◆ he said.

So Bascom is helping educate engineers in underground cable systems. He will present the *Aspects of Underground Power Cable Systems* course, Nov. 2-4, in Albany, New York. The course provides a broad introduction to underground transmission and distribution cables including cable system types and components, specifications, manufacturing, installation, operation and maintenance.

Bascom has taught courses for other consulting firms as well as the University of Pennsylvania and Siemens, involving cable system design, ◆ uprating, ◆ analytical techniques, and hybrid (underground and overhead) line design.

He keeps students interested in the topic at hand by varying the presentations with slides, video and hands-on problem sessions.

◆ If there is an opportunity to teach with another instructor, sometimes an interaction between the instructors helps develop a discussion among the students, ◆ Bascom said. ◆ There really is nothing worse than a class that doesn't ask questions; it's not rewarding for the instructors to teach and the students miss out on learning what is motivating other engineers to learn the subject. ◆

He tells students that despite all the good information that is presented in the classroom, including photos and videos, there really is no substitute for observing and, if possible, participating in the actual implementation of a project.

◆To say, for example, that a high-voltage cable splice takes four days of continuous work to build is somewhat different than standing in a vault while one is being built and considering the aspects of implementing the cable system design correctly while experiencing often overlooked details like changes in shifts and personnel, weather, security, etc.,◆ Bascom said. ◆Hands-on experience is really helpful in gaining an understanding.◆

Bascom has had plenty of hands-on experience. He started out working in the Software Products Department of Power Technologies, Inc. to develop time overcurrent and distance relay software while he was finishing his master's degree at Rensselaer Polytechnic Institute. He joined the Underground Cable Systems group at PTI in 1990 as an analytical engineer. During his nine years at PTI, Bascom gained experience in the T&D Technology and System Planning & Operations departments while focusing on underground and submarine cable applications and technologies. He worked for Power Delivery Consultants for 11 years, continuing his work with underground systems. Bascom co-founded Electrical Consulting Engineers earlier this year and is now a principal engineer where he assesses the integrity of existing cable systems, performs the full complement of cable design studies, works on research projects, and of course, teaches.

He became interested in engineering when he was about 12 years old; he said it seemed like an ideal application of math and science, both subjects he enjoyed. ◆I initially had an interest in the aerospace industry but then found electric power engineering to have more general application,◆ he said. ◆The job opportunities in electric power also were more plentiful at the time I was going to college 20+ years ago.◆

He has worked on several research projects for the Electric Power Research Institute involving underground transmission, including development of the EPRIGEMS Cable Ampacity Tutorial, Alternative Cable Evaluation (ACE) program, Power Transformer Analysis (PTLOAD) program and Substation Design Workstation. He wrote an expert system and reference manual for underground cable fault location, working as principal investigator for the Underground Transmission Workstation and as developer of the underground and aerial cable rating and temperature tracking models in the Dynamic Thermal Circuit Rating (DTCR) system. Bascom was a reviewer of the 1st edition (1992) of EPRI's *Underground Transmission Systems Reference Book* and principal author of the ampacity chapter in the 2nd edition (2007).

Currently, Bascom has enjoyed the travel that came along with being an instructor. He has learned about specific problems faced by engineers in other areas of the United States and, sometimes, in other countries.

◆I've taught courses in Thailand and Malaysia, and it was very interesting to appreciate the cultural differences when in the classroom,◆ he said. ◆The culture in some places is such that asking questions may show a lack of understanding, and there sometimes seemed to be reluctance in having interaction with the students, which was only exacerbated by a language barrier and working through an interpreter.◆

As a teacher, Bascom has to think on his feet, which helps him with one of his spare-time activities: volunteer ski patroller. ◆When on the ski patrol, you have to deal with a variety of situations and manage the scene.◆ He also works on home improvement and construction projects. ◆Getting one's hands into physical work provides a practical knowledge for how work is done, including in the engineering field where we focus on designing underground cable projects,◆ he said. ◆It's very satisfying to see something get built that you had a hand in designing.◆

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