

Overcoming Steep Slope Terrain Challenges

In any economy, new analytical tools provide more options for cost-effective excavation and development of sites with challenging terrain.

Challenging sites often include steep bedrock cuts or are previously quarried sites with remaining bedrock that is steeper than nature had intended. Gaining access to and developing these sites require a thorough understanding of the regional geology and the local subsurface conditions. Where significant rock cuts exist or will be made, it is essential that rock slope stability be evaluated based on both the structural and geotechnical features of the rock.

Traditional rock core samples leave many unanswered questions and provide limited information about the true structural orientation and potential planes of weakness. The oriented core information is particularly important when there are steep planes of weakness dipping into a proposed rock cut slope.

With advances in technology, there are powerful geophysical exploration tools to efficiently log and create virtual rock cores of a completed open bore hole.

Acoustic televiewer (ATV) methods are used to obtain rock structure data, such as foliations, bedding, joints, fractures, aperture and soil infilling. This data is then used in the analysis and design of rock slopes.

GeoDesign, Inc. uses a powerful suite of software by RocScience™ to evaluate the geophysical data. The evaluation begins with performing a three-dimensional analysis of the statistical occurrence of rock structure data and rock properties. The orientation and geometry of the

proposed rock slope is then analyzed to identify the potential for a range of failure modes, including planar and wedge type failures, toppling of rock prisms, and global slope stability.

Collectively, this approach of combining modern geophysical methods with powerful analytical software allows for the development of efficient, value-focused slope design, resulting in material balances for rock excavation, reduced construction capital costs and more efficient overall site development. ■



New analytical tools facilitate the development of challenging sites like this one with steep bedrock cuts.



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Kovalik Named to Consulting-Specifying Engineer's Top 40 Under 40

Alfred N. Kovalik, PE, LEP, vice president and shareholder of Geo**Design** Incorporated, has been named to Consulting-Specifying Engineer Magazine's prestigious 40 Under 40 list. According to the editors, the 40 Under 40 winners are among the elite young professionals in the field. Nominations came from a colleague, supervisor, or mentor, and they were selected based on professional and personal achievements, recently published papers or reports, and background on recent projects.



Al Kovalik (R) receiving the 40 Under 40 award from Scott Soddemsa, senior editor of Consulting Specifying Engineer Magazine at their annual event.

Quotes from references as part of Al's 40 under 40 Award Submission:

"I find Al to be smart, responsive to client needs, and a pleasure with which to work. I often refer clients to him."

Pamela K. Elkow, Esq.
Robinson & Cole Law Offices

"Al plugged right into the project team, sorted through all the project requirements, and completed all of the work needed on time."

David R. Kerschner, CPG
Principal, K.U. Resources, Inc.

"As a board member, Al generously volunteered his time and technical skills in helping us with several vacant-lot cleanups and with interpreting engineering reports for a major brownfields project."

Richard J. Tiani, Executive
Director, Groundwork Bridgeport



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