

“Rocscience. Your applications are for rock, not soil, right?”

It’s a question that is occasionally asked by customers new to our programs.

Rocscience is indeed built on years of research and experience in rock, but during this time, we’ve also developed and evolved the soil capabilities of our software. We recently sat down with Dr. John Curran, founder of Rocscience, to find out more about Rocscience’s soil capabilities and applications.

Some new customers are surprised that we work in soil, how do you respond to their perception that we work exclusively in rock?

“With a name like Rocscience, it’s natural that some geotechnical practitioners assume that our expertise is in rock, not soil. Back in the early 80’s, I suppose it was true: my research team at the University of Toronto was known as the Rock Engineering Group, and our work was focused more on rock than soil engineering.

When we formed Rocscience, our first major task was to rewrite our DOS-based software for Windows, and extend its applicability to solving practical geomechanics problems. At that time, most of our DOS software focused on rock, so our early Windows software dealt mainly with rock engineering issues.

What some people may not know, is that from the beginning, our R & D team was simultaneously growing its experience in soils as well: one of our first programs, completed in the late 80’s, was Slide 1.0 for DOS. Slide is a slope stability program mainly applicable to soils. It’s in its 5th version now, so more than 10 years later, we’ve built some serious expertise in this area. Examine^{2D} and Examine^{3D} are also applicable to both soil and rock – they’re based on linear elastic material models.”

In your opinion, what are the greatest challenges facing soil engineers right now?

“Well, there are a number of constitutive models for soils, but very few of them are available in commercial software, so that’s one of the biggest problems soil engineers are dealing with right now - the soil models available to practitioners are lagging far behind those being used by researchers at universities.

Rocscience has the necessary resources to carry out much-needed technology transfer, and incorporate the best research developments in soils into our software so it’s available to engineers working in the field. Our plan is to evolve our software to the point that an engineer can use our programs to deal with the full spectrum of geomaterials - from soft soil to till to weak rock to hard brittle rock.”

What kind of soil analysis capabilities does Rocscience currently have in its software?

“Right now, Slide includes a total of 11 failure models that are specifically geared to soils, as well as a number of support models relevant to soil such as geotextiles and soil nails. It also includes a built-in groundwater module that allows engineers to deal with effective stresses in saturated and unsaturated soils.

The next version of Phase², our finite element program, will allow engineers to model effective stresses and include several constitutive models that are applicable to soils including the Duncan-Chang hyperbolic model and the Cam-Clay critical state model.”

How will Rocscience software help engineers solve their soil problems in the future?

“In the near future, our users can expect more constitutive models applicable to soil. And in several of our programs, we’re building the ability to deal with specific soil behaviours such as consolidation and liquefaction, as well as problems such as bearing capacity, sheet pile walls and piles.

Since geotechnical problems generally involve soils much more often than rock, it’s in our best interest to continue to build functionality in our software to deal specifically with soils. Plus, we want to make programs that are helpful and that get used – that’s why we do what we do. So Rocscience is escalating its work on the soil side; we’re putting a great deal of effort into soils right now. We’re in the business of creating “software tools for rock and soil” – meaning, programs that allow engineers to analyze and design solutions to their geotechnical problems in both materials, seamlessly.”

Thanks John.

The Rocscience software development team has been working in both rock and soil mechanics for more than 15 years – even before its inception as a company in 1996. During this time, we’ve developed a significant understanding of soil behavior and a family of software that reflects this. We continue to focus in this area; in the coming months look for increased soil capabilities in our programs, including more soils models, and more value than ever for soil engineers.