Where geology meets engineering in hydrothermally altered environments: considering veins in geotechnical design

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Abstract:

In modern rock engineering projects such as transportation tunnels and base metal mines featuring particularly deep underground excavations and large open pit slopes, effective geotechnical characterization of the rockmass is critical to the initial excavation and ground support design, and to the accurate prediction of rockmass behaviour throughout project development. Many modern projects around the world are being excavated through complex rockmasses that contain healed intrablock rockmass structures (e.g. hydrothermal veins), which occur within fracture-bounded blocks of otherwise-intact rock and influence rockmass deformability and strength. Intrablock structures are not conventionally considered during geotechnical characterization and analyses in rock engineering projects. However, in particularly deep excavations at high stress, these structures have been observed to control additional or delayed development of ground failures, through what is traditionally considered to be intact rock, or a predictable, naturally-fractured rockmass. This talk will discuss current methods in industry and new research developments to integrate intrablock rockmass structures into various stages of geotechnical design: (i) site investigation and field data collection from outcrops and drill core; (ii) laboratory testing for both mineralogy and geotechnical tests; and (iii) numerical modelling with options for continuous and discontinuous methods.

Bio:

Jennifer Day is a Geological Engineer and joined the University of New Brunswick in 2016 as an Assistant Professor. She received her PhD from Queen's University in 2016 and her thesis received international recognition from the American Rock Mechanics Association in 2017 for the most outstanding doctoral dissertation in rock mechanics or rock engineering in North America (Dr. N.G.W. Cook PhD Thesis Award). Current research interests focus on integrating geological and engineering site investigation including field, laboratory, and numerical model based characterization of rock and rockmass systems, in particularly complex geological settings, for applications in rock engineering design of surface and underground excavations.