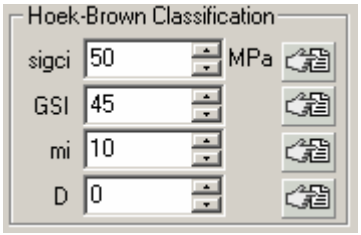
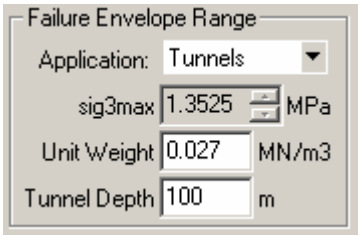
Example 1 – Hoek-Brown Strength Envelope for a Tunnel in Undisturbed Rock (D = 0)

Consider an undisturbed in-situ rock mass surrounding a tunnel at a depth of 100 meters, with the following Hoek-Brown classification parameters.

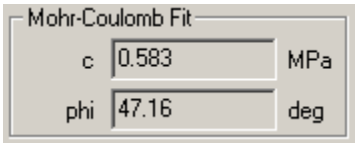


Enter this data in the sidebar input data area. Also, enter the following data to determine the Failure Envelope Range (sig3max), which is used to calculate equivalent Mohr-Coulomb parameters for the Hoek-Brown model.



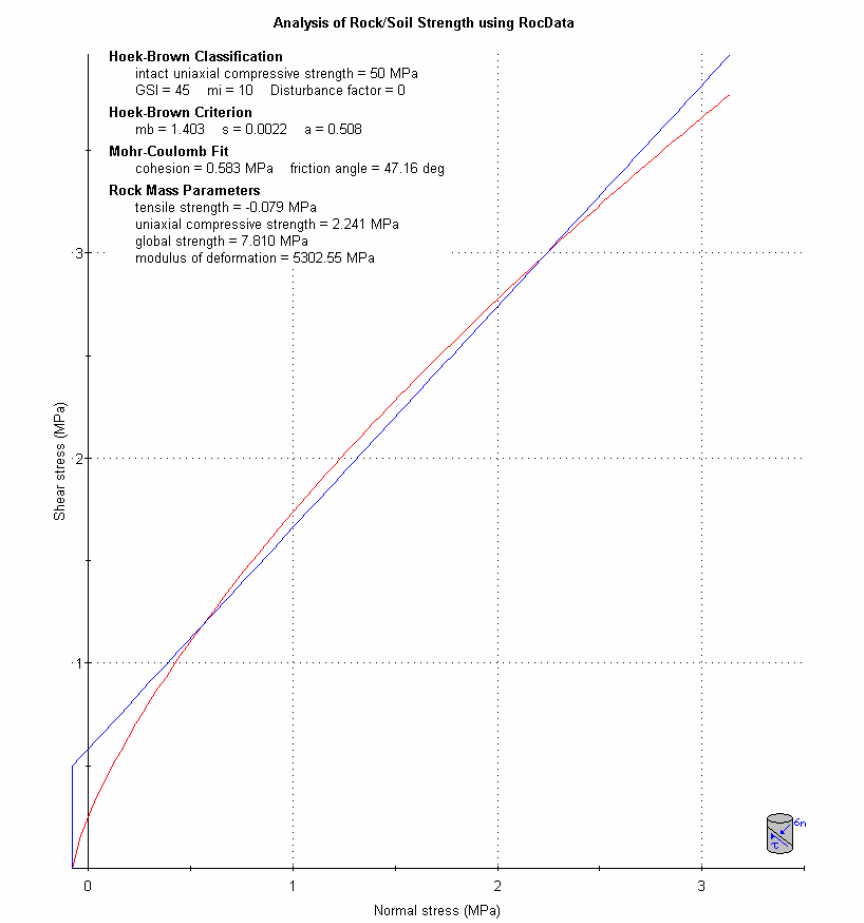
The resulting output will be automatically displayed in the sidebar, and the failure envelopes calculated and plotted.

Notice the equivalent Mohr-Coulomb parameters that have been calculated:



The envelope corresponding to these parameters can be viewed on the plots, by selecting the Mohr-Coulomb strength envelope option, from the toolbar or the Analysis menu.

To get a better look at the MC envelope, let's view only the Normal vs. Shear stress plot. Select the Normal vs. Shear Stress option from the Analysis menu or the toolbar. This will hide the principal stress plot, and show only the Normal vs. Shear stress plot, maximized in the view.



If you examine the MC envelope, you can graphically confirm the calculated values of cohesion, friction angle, and also the rock mass tensile strength **sigt**. The tensile strength is the negative value of normal stress, at the origin of the failure envelope.