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THE INFLUENCE OF THE VOID SHAPE IN THE BEARING CAPACITY OF ROCK MASS WITH A SUPERFICIAL VOID

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In this study is proposed a chart that allow estimating the reduction of bearing capacity due to the existence of a superficial void in a rock mass. It is contemplated the influence of different shapes and size of the void in relation to the foundation.

The reduction of the bearing capacity is analyzed through the Finite Difference Method. In the numerical model, six possible cavity shapes are considered, with three different sizes and depths. Calculations are made considering eighteen types of rock masses, modelled by the H&B failure criterion.

The results demonstrate that the critical depth where the cavity no longer influences the bearing capacity varies considerably depending on the geometric variables (size, shape and location of the void). In addition, it is observed that the relation between the bearing capacity obtained considering the rock mass with and without void is not affected by the geotechnical parameters of the H&B failure criterion.

According to the results analyzed and graphic output, the variation in the stress distribution in the rock mass and the change of the failure mechanism under the different hypotheses studied can be observed. The results are presented in chart that facilitate to directly estimate the reduction of the bearing capacity of a rock mass with void based on geometric parameters.