

ABSTRACT

Rock mechanics is a study of the mechanical properties of rock and rock mass, which suggests rock mechanics to have a dominant role in mining activities, such as tunneling, drilling, excavation, and blasting. To find out the mechanical character of rocks and rock masses, various kinds of test were carried out both in the laboratory and in the field directly or insitu. Uniaxial compressive strength test is one of rock mechanical properties test which is carried out on rock samples aiming on measuring the strength of the rocks and used for the parameter of classification and characterization of intact rocks. The rocks samples used in this test are the rocks with regular geometry, both in the form of cylinders, cubes and prisms.

Ratio of length and diameter (L/D) or height and side (h/S) is one factor that influence the results of the uniaxial compressive strength test. Therefore, the purpose of this study is to determine the effect of the ratio on the results of the uniaxial compressive strength test and to model the stress distribution and trajectories that occur in each rock sample.

Rock samples used in this study are two types of rocks; sandstone and granite, which geometrically cylindrical and cube, and the number of rock samples used for the uniaxial compressive strength test was 97.

The results of the uniaxial compressive strength test yields that the smaller the L/D or h/S ratio, the greater the uniaxial compressive strength, and vice versa. Meanwhile, the results of numerical modeling results that in the modeling of rock samples for all geometries and rock types the smaller the L/D or h/S ratio, the highest stress contour model is in the middle of the rock sample, and the greater the L/D or h/S ratio, the highest stress contour model is only at the top and bottom of the rock sample, whereas for L/D and $h/S = 2.5$ the stress contour looks more evenly distributed in all parts. Furthermore, the stress trajectory results illustrate the triaxial effect on each rock sample, but this effect does not have a significant effect anymore when L/D or $h/S \geq 2.5$.

Based on the test results of rock samples it can be concluded that the ratio influences the uniaxial compressive strenght result, and it is significant for hard rock samples.