ABSTRACT

In mining activities, especially underground mining implementing Room and Pillar method, stability of underground openings is an important role in supporting all activities that take place. One of the factors that influence the stability of the underground openings is the strength of pillar rocks. By using underground openings during the life of mine, roof and floor of rocks (pillar) are exposed by stress condition continuously, as the result is the phenomenon of creep that influences the stability of underground opening. A case that can be studied in a laboratory is the creep test of a rock sample to find constant use to calculate time-dependent deformation of a rock ,strength of pillar and time failure estimation.

A creep test is conducted by giving a constant axial load to a rock sample then the deformation that occurs during testing is recorded as a data to analyze which rheological model is suitable to its behavior. Tuff samples used in this study were taken from Dusun Sumberan, Tancep, Ngawen, Gunungkidul, Yogyakarta. Results of the test showed that behavior of most samples followed the Burger model (a serial combination of the Maxwell and Kelvin models). Rheological constant as a result of test is as follows:

K = 513,44 MPa - 769,99 MPa

$G1$ = 33,00 MPa – 208,75 MPa

$G2$ = 17,80 MPa – 39,12 MPa

$\eta1$ = 17.720,54 MPa.menit – 75.186,52 MPa.menit

$\eta2$ = 12.816,66 MPa.menit – 1.170.000 MPa.menit

Tuf stone long-term strength for size sample 2 inch is 80,20% σc, for size sample 3 inch is 55,10% σc, for size sample 3 inch is 70,07% σc.

Based on the result of research determination of strength and time failure estimation of pillar. the biger dimension of the pillar is used it will be even smaller strength and time failure estimation with biger dimention of pillar it will given fast time failure estimation.