This study aims at identifying the failure tendencies of rocks in relation with crack growth. Therefore, several disc shaped specimens with (H/D) ratio of 0.5 were prepared from various rocks. First, notches of four different lengths were sawn on the specimens. Then, a single notch was formed in each specimen, which was tested as the load was applied up to failure level. The results yielded a linear relationship between the failure load and corresponding crack lengths. It was concluded that the slope values (m) of the lines be related to the failure tendencies and crack propagation velocities of rocks. Finally, statistical relationships were established between the slope values of the relationship lines and certain rock properties.