

# Investigation of creep damage mechanical behaviors of red sandstone considering temperature effect

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July 2, 2021

## Abstract

This work investigates the influence of temperature on the creep damage behaviors of red sandstone. The samples treated at 25 , 200 , 400 and 600 are selected to carry out the uniaxial compression and creep experiments. It is found that temperature has obvious influence on uniaxial compressive strength, Young's modulus and failure modes of red sandstone. It can be also believed that the temperature can degrade the mechanical behaviors of red sandstone. However, as the temperature increases, the damage value does not always increase, the damage variable has a negative value at 25 ~ 400 . It can be found that the higher the temperature, the larger the effect of loading ratio on the ratio of creep strain to instantaneous strain, that is, temperature reduces the ability of red sandstone to resist creep deformation. Acoustic emission (AE) technology has been also used in the loading process of uniaxial compression and creep tests. It is found that the probability density of AE absolute energy of different samples still satisfies the Gutenberg-Richter law well. In uniaxial compression test, as the temperature increases, the absolute value of the critical index increases exponentially. In the uniaxial creep test, as the loading ratio increases, the absolute value of the critical index first decreases and then increases. When the loading ratio is the same, as the temperature increases, the absolute value of the critical index also increases exponentially.

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