

EFFECTS OF LOW TEMPERATURE ON THE MECHANICAL PROPERTIES OF CONCRETE-FILLED PVC PIPE

KWEKU DARKO FORSON & MA QINYONG

School of Civil Engineering and Architecture, Anhui University of Science and Technology, Huainan, P. R. China

ABSTRACT

In order to review the mechanical properties and capability evolution of concrete-filled PVC pipe subjected to low temperature throughout uniaxial compression, the uniaxial compression test of concrete-filled PVC pipe was performed. Per to the evolution law of peak total energy of concrete-filled PVC pipe subjected to low temperature during deformation and failure under different curing ages and temperatures, the effects of curing ages and temperatures on concrete-filled PVC pipe were analyzed from the perspective of energy. The results show that temperature improves the strength and damage endurance of concrete-filled PVC pipe to varying degrees. For samples cured for 28d, the compressive strength of concrete-filled PVC pipe at -20°C was 44.529% higher than that at 20°C. The stress process of concrete-filled PVC pipe under load is categorized into three stages: elastic stage, yield stage and failure stage. Under different curing temperatures, the peak total energy of concrete-filled PVC pipe increases with the increase of age. Under different curing ages, the peak total energy of concrete-filled PVC pipe increases with the decrease of curing temperature. For samples cured for 28d, the peak total energy of concrete-filled PVC pipe at -20°C is higher than that at 20°C. With the decrease of curing temperature, the crack of PVC pipe along the axial direction shows continuous decline and the crack of concrete damage is also reduced additionally.

KEYWORDS: *Concrete-filled PVC pipe, low-temperature, Uniaxial compression, Mechanical properties, Energy mechanism & Failure pattern*

Received: Mar 17, 2021; **Accepted:** Apr 07, 2021; **Published:** Apr 21, 2021; **Paper Id.:** IJCSEIERDJUN202110