



Experiment study of mechanical properties of cement solidified soil in negative temperature

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Serious differential settlement often occurs in engineering and construction built in permafrost regions due to the existence of warm and ice-rich frozen soil. In order to prevent the disaster of thaw collapse, the mechanical properties of frozen soil can be improved by adding cement and additives. In this paper, three different cements (SAC, OPC and MPC) are used to solidify warm and ice-rich frozen soil. The compressive properties and unconfined compressive strength of cement-solidified soil under the action of different cement contents and curing ages are studied. Meanwhile, the mechanism of solidification was analyzed by measuring the change of water content and analyzing the product by scanning electron microscope. The results show that the addition of all kinds of cements reduced the moisture content of the frozen soil. However just the cement-solidified warm and ice-rich frozen soil by SAC and OPC can eliminate the thaw collapse and deformation. OPC has little effect on the solidification of warm and ice-rich frozen soil. This suggests that not all kinds of cements can be used to solidify warm and ice-rich frozen soil. It provides a theoretical basis for cement-solidified frozen soil. And it is of great significance to the prevention and control of disaster of thaw collapse in permafrost regions.