Song Zhang[1], Zuren Yue[2], Tianliang Wang[2]

[1]1.Shijiazhuang Tiedao University, Shijiazhuang, Hebei, China 2. Beijing China Coal Mine engineering Co. Ltd. Beijing, China
[2]1.Shijiazhuang Tiedao University, Shijiazhuang, Hebei, China

Abstract

Prediction of freezing temperature field close to the segment is very important in artificial ground freezing project. Because of the effect of convection and heat conduction, there are a lot of factors in numerical simulation for these problems. If the length of freezing wall close to segment is less than design value, it could cause many geotechnical problems. In the paper, it has a primary exploration and application on COMSOL Multiphysics, based on the model of heat transfer in soils for the temperature field analysis. It defined the heat transfer of segment by convective heat flux and the heat transfer coefficient option chose External natural convection. In order to simulate the boundary, it defined an infinite element domain around the model. All temperature parameters were obtained by in-situ observation values such as: temperature of external and calcium chloride solution in brine intake. Through the calculating example and in-situ test, the reliability and feasibility of the model and paraments are verified. Then analyzed the temperature field with a polystyrene insulation layer cover on segment. And compared the results in Fig.1. This research could help predict temperature fields at different locations in contact passage project by artificial freezing method. And get the function of depth and temperature close to segment.
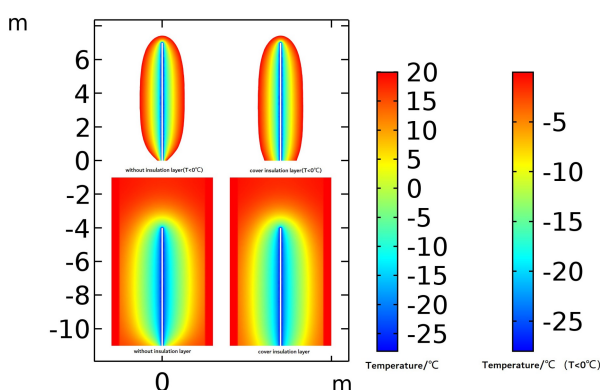
Figures used in the abstract

Figure 1: Temperature Field in Different Boundary Conditions