

Application of the geothermal snow melting system at the campus of Seoul National University

*Sung-Min Kim¹, Jin Son¹, Myeongchan Oh¹, Hyeong-Dong Park¹

1.Dept. of Energy Systems Engineering, Seoul National Univ.

Seoul, the capital city of South Korea, has four distinct seasons and the snowfall causes some problems in winter. Especially the campus of Seoul National University located in Mt. Gwanak is high-altitude area with lower temperature than downtown. Therefore, the roads are frozen frequently and it may cause significant problems to pedestrians and cars. However, occasional snow removal works by snow-plough vehicles or human powers cannot meet the immediate needs. In this study, geothermal snow melting system is designed and applied to the road from the bus stop to the buildings of the engineering college for enhanced safety of students and faculties. Mt. Gwanak comprises a basement of granite so that geothermal snow melting system depends on just the geothermal gradient due to lack of other magmatic heat sources. A borehole was drilled to a depth of 500 meters from ground level and three other boreholes were 140 -170 meters for further monitoring. The weathering grades of the rocks are mostly classified from moderately weathered to fresh. Therefore, this area is estimated to be suitable for the heat exchange with groundwater using geothermal heat pump. The heat pump system of 30 RT (Ton of Refrigeration) was installed and 8 lines of pipes were employed to the 155 meters road with 1.45 meters width for water circulation. As a result of recent operations on January 26, 2016, a few cm of snowfall was melted instantly.

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