

Monitoring in a district heating pipeline system

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Abstract

District heating has been for many decades a well-established industry for supplying heat in several countries. Surplus heat from power plants and industrial processes are used as well as recently renewable heat sources such as solarthermal, geothermal and heat from biomass combustion. The success of heating distribution to the final users depends significantly on the pipeline network. The need for understanding the response of buried heating pipeline systems has led to the development of a monitoring programme. This programme includes the design, construction and operation of the connection of an instrumented pipeline section to an operating local district heating network. Particular conditions were tested such as thickness of cushion materials, medium temperature ranges and bedding soil type. This unique instrumented pipeline allowed the analysis of initial results of temperature and pipe axial displacements, which are relevant for the district heating industry. It was found that when temperature increased from ambient conditions up to 90°C, pipes were moving all along their length. Moreover, after a temperature drop from 90 to 20°C during 20 days and subsequent increase to 90°C again, axial displacements did not return to the same values as before.