

Empirical Study on B-DASH Project (Road Snow Melting Technology using Sewage Heat) (Research period: from FY2018)

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1. Introduction

As a general characteristic of sewage temperature, it is warmer in winter and colder in summer than the outside air. Use of this temperature difference as heat energy is expected to reduce oil and natural gas consumption as well as CO₂ emissions. In addition, possibility of supply and demand matching with heat consumers in cities is high since there is a large amount of sewage in cities. The Ministry of Land, Infrastructure, Transport and Tourism (MLIT) is therefore implementing projects actively to promote the use of sewage heat as unused energy.

Meanwhile, the MLIT has been implementing the Breakthrough by Dynamic Approach in Sewage High Technology (B-DASH Project) since fiscal 2011 with the Water Quality Control Department of the NILIM as implementing organization, and two proposals for road snow melting technology by sewage heat were adopted in fiscal 2018. This paper introduces the outline of these two technologies adopted.

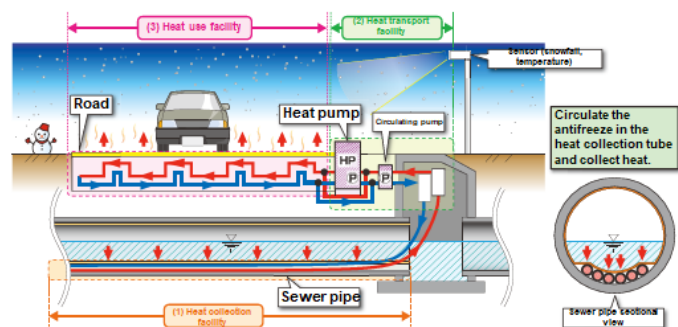
2. Outline of demonstration technologies

(1) Empirical study on practical use of snow melting technology using sewage heat from small diameter pipeline (Joint Research Organization of Toa Grout Kogyo Co., Ltd., Maruyama Komusho Co., Ltd., and Tokamachi City)

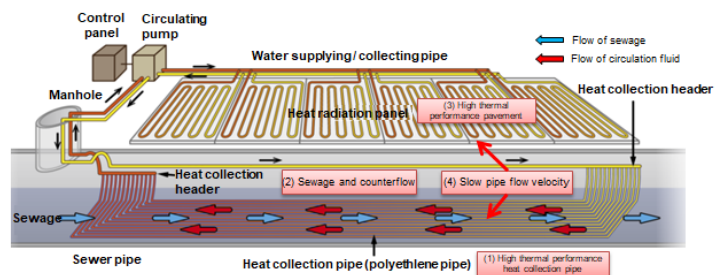
This technology enables the use of sewage heat with small and-medium-size diameter pipeline not more than $\phi 800\text{mm}$, which had been difficult, by installing heat collection pipes at the time of pipe rehabilitation work, which is one of the measures for deterioration of sewer lines. This technology also aims at more efficient road snow melting than before by automatic switching between operation using only sewage heat (only the circulating pump operates) and operation using heat pump jointly, according to weather conditions such as snowfall and air temperature (Fig. 1 (a)).

(2) A study on the sewage heat snow melting system to realize low LCC and high COP (coefficient of performance) with heat pumpless (Joint Research Organization of Kowa, Ltd., Sekisui Chemical Co., Ltd., and Niigata City)

This technology aims at road snow melting at lower cost (low LCC) and more efficiently (high COP) than



(a) Empirical study on practical use of snow melting technology using sewage heat from small diameter pipeline



(b) A study on the sewage heat snow melting system to realize low LCC and high COP with heat pumpless

Fig. 1. Outline of Technologies

before using only sewage heat, without using heat pump, by adopting heat collection pipes and pavement material with high thermal conductivity and devising the direction and velocity of the flow of circulation fluid (Fig. -1 (b)).

3. Utilization of empirical study findings

At present, installation of the demonstration facility was just completed and operation of the facility and collection of various data was started. We are going to formulate guidelines for technology introduction after checking technical performance and various costs using operation results and collected data,

See the following for details.

<http://www.nilim.go.jp/lab/ebg/b-dash.html>