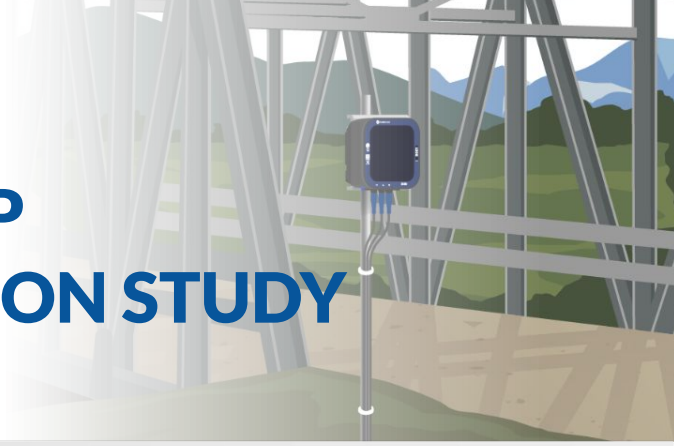
beadedstream

OKSRUKUYIK CREEK DEEP FOUNDATION VERIFICATION STUDY

CASE STUDY



The replacement of the Oksrukuyik Creek Bridge, situated approximately 100 miles south of Deadhorse, Alaska, posed unique challenges due to the demands of the permafrost soil and thermal influences from the creek's thaw bulb. The project required the implementation of a specialized ad-freeze pile design for the bridge abutments supporting the deck, necessitating a vigilant approach to address the impact of thermal fluctuations on the bridge's foundation stability.

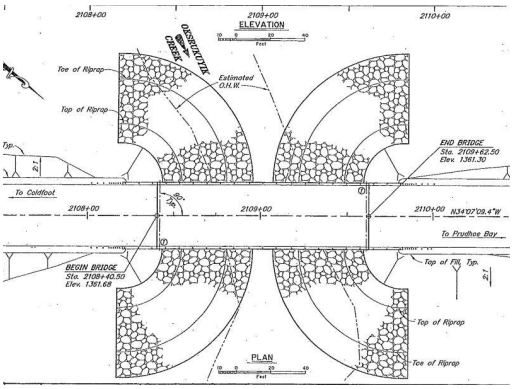
AK DOT

Alaska, USA

Application

Design, installation, and maintenance of infrastructure in extreme northern climates, especially those featuring permafrost soils, demand meticulous consideration. This includes the isolation of roadways from the native tundra using carefully designed embankments. Similarly, for bridges, foundation piles must be strategically placed deep enough to counteract the effects of heave caused by permafrost. The Oksrukuyik Creek Bridge project applied a specialized ad-freeze deep pile design to fortify the foundation and prevent potential thaw-induced settlement, safeguarding both the infrastructure and the surrounding environment for the 50 year design life.

D405 Data Logger with two Digital Temperature Cables attached



OK Creek plan drawing

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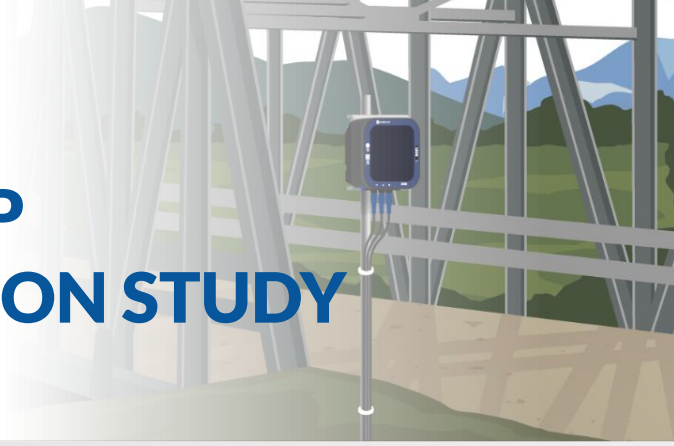

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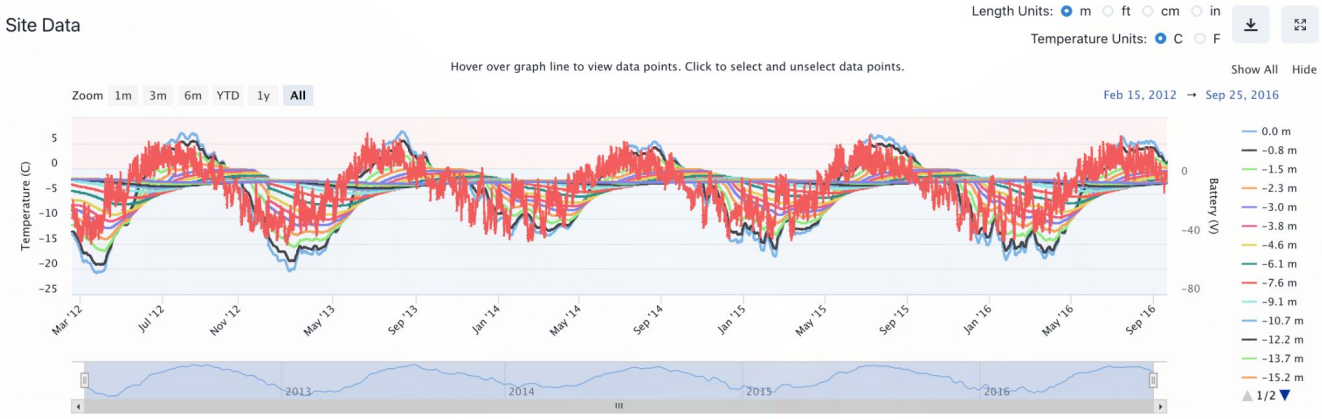
beadedstream Solution

To ensure the stability of the foundation design, **beaded**stream was engaged to provide a customized temperature monitoring package tailored to the unique demands of the project. The solution included the deployment of 60-foot Digital Temperature Cables installed in PVC conduits along both bridge abutments. Each cable, comprising 15 sensors, was strategically placed vertically at the abutments, effectively measuring and verifying the thermal impacts on the permafrost surrounding the foundation.

The temperature data collected from the sensors were logged and transmitted remotely using the D405 Satellite Data Logger, ensuring the collection of temperature data for a minimum of 5 years. This remote data collection methodology eliminated the need for physical site visits to this remote location, providing a continuous and comprehensive dataset crucial for monitoring and verification objectives.



*Project Site Data from March 2012 to September 2016, taken from **beaded**cloud monitoring dashboard.*

beadedstream Solution Benefits

The remote data collection technology empowered engineers from the Alaska Department of Transportation and Public Facilities (AKDOT) to efficiently and proactively gather crucial temperature data without the need for physical presence at the remote site location. This approach ensured a continuous and consistent dataset, meeting monitoring and verification objectives and allowing engineers to swiftly respond to any adverse thermal variations, which were observed at the site. Additionally, this remote data collection method not only established best practices in northern engineering but also saved time and resources by eliminating the need for on-site visits. Furthermore, it enhanced the safety of staff by avoiding potential encounters with wildlife in these remote locations, thus ensuring a secure working environment.

This solution resulted in a comprehensive dataset that supported the efficacy and reliability of the bridge project in the harsh and remote northern environment. The provided dataset showcases temperature trends from March 2012 to September 2016, offering insights into the long-term thermal behavior surrounding the bridge abutments.

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