



GEOKOAX[®]
geothermal systems

Geothermal points heating

in Farchant at the foot of the
Zugspitze (13,4 kW)

As of March 2015



GEOKOAX probes keep railway points free of ice and snow - with zero emissions. (Photo: TripleS GmbH)

Background

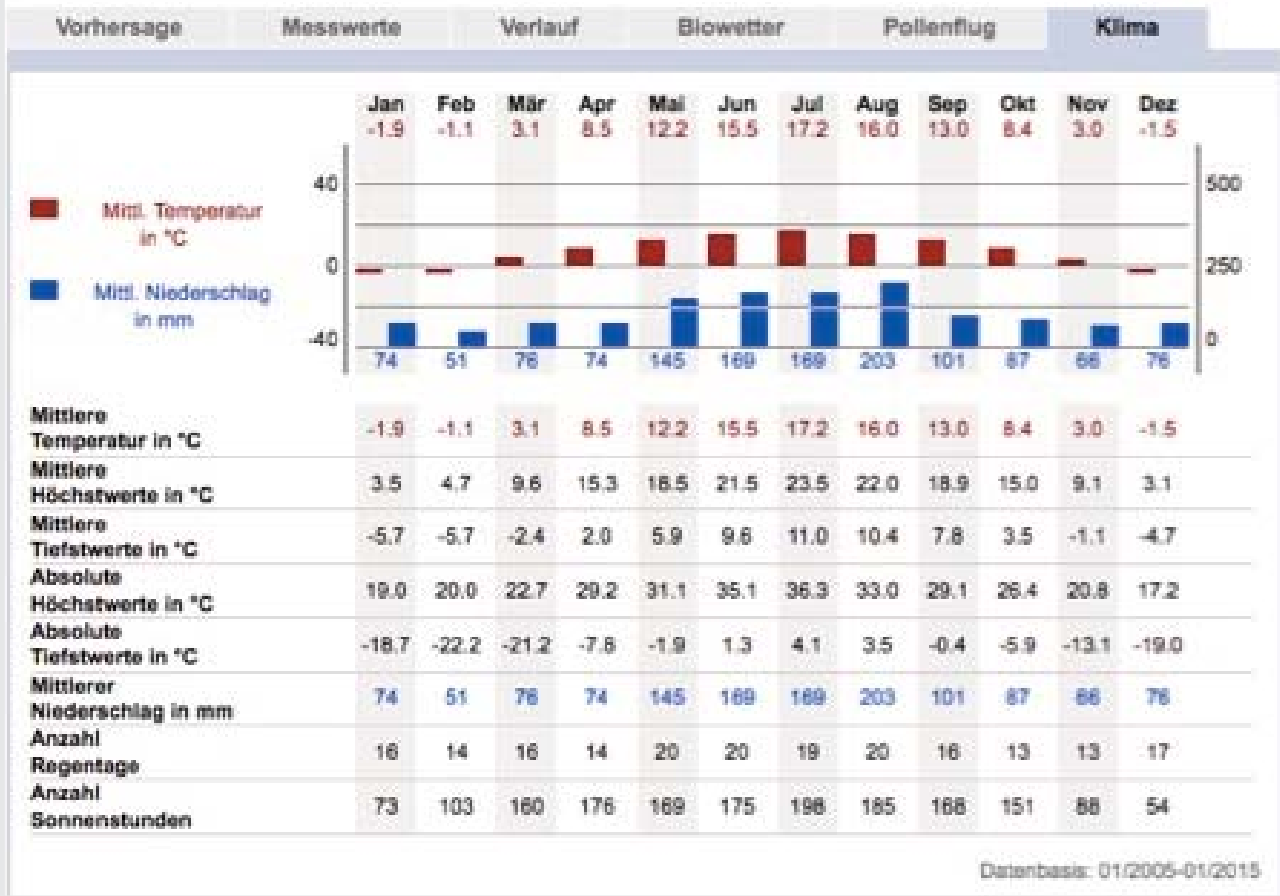
The Deutsche Bahn DB Netz AG, a subsidiary of the German national railway company responsible for the integrity of the 33,500 km long railway network, undertakes considerable efforts every winter to clear railway tracks and keep them safe. Particular attention is paid to the railway points. The DB AG keeps 56,500 of the roughly 70,000 railway points free of ice and snow using point heating systems. So far, the majority of all railway points in Germany is heated with an electric resistance heating or gas. This kind of frost protection costs the Deutsche Bahn AG about 44 million euros each winter. Not to mention the immense CO₂ emissions. This is why geothermal energy, as a virtually climate neutral and exceptionally cost-saving heating alternative, is the subject of a pilot system in Farchant at the foot of the Zugspitze. Here, the DB Netz AG operates a geothermal points heating based on the GEOKOAX volume probe technology. It is the first facility of its kind in Upper Bavaria.

A particular challenge is the extreme alpine geology: the GEOKOAX probes stand in 2°C cold glacial water.



The Upper Bavarian Farchant
near the Zugspitze
(Ammergau Alps, photo: Rüdtenklau)

Klima Farchant - Station Garmisch-Partenkirchen (719 m)



Climate table of Farchant: temperatures in winter are far below the freezing point.
[\(http://www.wetterdienst.de/Deutschlandwetter/Farchant/Klima/\)](http://www.wetterdienst.de/Deutschlandwetter/Farchant/Klima/)

Since commissioning in winter 2012, the system runs smoothly and ensures full availability of the railway points and thus the punctuality of trains. Most notably, the system demonstrates that the GEOKOAX technology, owing to its volume reservoir, does not slip into freezing zones.

Planning

The DB Netz AG entrusted the company triples with the planning and implementation of a new installation of two point heaters. As a supplier of geothermal special applications, triples supports its clients from feasibility studies through to commissioning. This includes approval and licensing procedures as well as construction management and the development of heat sources. An interdisciplinary partner network assures factual competence and safety during implementation.

All geothermal point heaters from triples have a full DB authorization and are compatible with all common rail profiles und radii. The result is a very high availability of more than 99.5% on 365 days of the year and a drastic reduction in operating and energy costs.

triples uses GEOKOAX volume probes for developing geothermal energy. In comparison to conventional probes, the coaxial technology of GEOKOAX probes provides a significantly higher efficiency. As a consequence, the required heat energy can be supplied with less probe meters. This reduces investment costs as successfully as any drilling risks. Especially in areas with drilling depth restrictions, in water protection areas or on small properties, the coaxial technology of GEOKOAX probes are often times the only way to implement a geothermal

system. Thus, only five 36 meter GEOKOAX probes supply the energy for permanently keeping the railway points free of ice and snow.

Michael Funke, managing partner of triples GmbH, recounts: "Since commissioning the points heating in Farchant, we have already measured temperatures as low as minus 25°C. Our system proved itself in the most adverse conditions and convinced everyone involved".

Realization

For the deployment of the GEOKOAX probes, five drillings of 36 meters each were carried out with the down-the-hole-hammer method and a protective casing. The first two meters consisted of clay, further down gravel, offset partially with sand, clay and silt were encountered.

The boreholes were compressed using the tremie method with a colloidal mixer and a grout from Fischer Spezialbaustoffe GmbH resistant to sulfate, carbon dioxide and salt water. The heat energy is extracted from the subsurface and the ground water by five GEOKOAX probes. As a heat pump, a model manufactured by Weider with 13.4 kW heating output was installed. The piping system, carrying heated brine from the heat pump, is mounted along the railroad track and acts as a heat exchanger.

Summary

Based on the GEOKOAX technology, the geothermal points heating in Farchant consumes less than a third of the usual amount of energy. The volume probe delivers optimal performance even in minimal depths and is therefore also the first choice in geologically sensitive areas. Since the power for the heat pump is derived from waterpower supplied by a local energy provider, operation of the points heating is 100% climate neutral.

This pilot project of DB Netz AG clears the way for an energy-saving,
CO2-free mobility – even in winter!



Examining the new points heating (right to left):
Martin Wohlketter, Michael Funke, District
Administrator Harald Kühn, Georg Fahrenschon
and Member of Parliament Markus Blume.
(Photo: Kaiser, Merkur Online)

The GEOKOAX company:

GEOKOAX GmbH, which is headquartered in Munich/Germany, is an innovative, international company with a branch office in Cologne/Germany and distribution partners in Serbia, Poland and in South Carolina/USA. GEOKOAX GmbH offers patented geothermal technology made in Germany. Using a highly qualified team consisting of business management graduates, chemists, planners, project managers and heating engineers, GEOKOAX offers complete solutions for close-to-surface geothermal energy. From site surveys to planning, testing, implementation and subsequent monitoring – the expert team of GEOKOAX has experience gained from more than 1,000 projects implemented in Germany, the Netherlands, Switzerland, Serbia and the Czech Republic.

The GEOKOAX geothermal volume probe:

The GEOKOAX volume probe, as the highest performing geothermal probe system, enables reliable solutions for heating and cooling of residential and commercial properties. Everywhere, even in areas with drilling depth restrictions. Also on smaller properties with high energy demands, such as usage-intensive multi-story buildings in urban areas, GEOKOAX enables reliable planning and a safe implementation of projects that could not be developed with conventional systems. Its high level of performance and up to 60% less drilling meters predestine the GEOKOAX geothermal volume probe for large construction projects or demanding, complex EnEV 2014 building renovations.

Participating companies:

Geothermal Volume Probes:
GEOKOAX GmbH

Builder:
DB Netz AG

General Contractor:
triple.s GmbH, geothermal special applications

Building materials:
Fischer Spezial-Baustoffe

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