Description

The technique involves placing a closed ground loop in the cast in situ concrete piles or diaphragm walls during construction. The loops are filled with a glycol and water solution and are connected to heat pumps, which utilise the differential between the ground and surface temperature. Depending on the season and building requirements the loop network is capable of cooling a building in warm weather by transferring heat into the ground, or providing heating during cool periods by extracting heat from the ground. A temperature differential from the ground loop of five to six degrees Celsius can meet the heating and cooling requirements of a building. The piles provide both foundational support and long-term space heating and cooling. Skanska won a Quality in Construction Award in 2008 and the 2007 UK Green Subcontractor of the Year award for the Energy Pile® solution.

Benefits

Environmental

Skanska's Energy Pile® systems do not pollute the environment and can help reduce the carbon emissions of a building up to 50 percent. Once operational, energy pile projects constructed by Skanska to date in the UK will save an estimated 3,700 tons of carbon dioxide each year. Energy Piles® typically meet at least 15 percent of a building's total energy consumption. Less external heating and cooling equipment may improve the architectural aesthetics of the development. The use of Energy Piles® also offers projects up to seven BREEAM environmental assessment tool points.
This is an interpretation of the information available and should not be taken as exact. Application of this solution must utilize local knowledge and take account of local requirements and conditions.

Benefits (continued)

Economic
Energy Pile® systems can reduce the amount of fuel required for heating and cooling a building by approximately two thirds. The additional financial investment required for a heat pump installation is typically paid back within three to six years and the ground loop system has a projected life span of over 200 years. Unlike other geothermal systems, Energy Piles® use the structural foundations of a building and avoid the extra cost of land required to install boreholes or wells outside a building’s footprint. A heat pump system requires half the internal floor space of a conventional building heating and cooling system because each heat pump can provide heating and cooling depending on the building’s requirements. An Energy Pile® solution can also help overcome the increasing planning and regulatory requirements for alternative energy sources.

Application

Recent projects
One Kingdom Street is a state-of-the-art office development constructed by Skanska in Central London, which uses an energy pile system to produce approximately 210 kW of heating and 85 kW of cooling within communal areas of the building. Skanska has installed over 2600 Energy Piles® in the UK, for developments such as hotels, police stations, art galleries, collages and office buildings.

Future market potential
Skanska is a market leader in the UK geothermal energy sector and has established a strategic partnership with Geothermal International who provide specialist technical expertise. The demand for Energy Piles® has increased and is expected to further increase as energy costs continue to rise and greater renewable energy requirements for new buildings are introduced. Energy Piles® are suitable for a wide range of developments in most Skanska markets and are also being considered for temporary site energy generation by doubling as tower crane foundations or preliminary test piles.

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