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VivaTech: IFP Energies nouvelles and Solinjection present an innovative soil treatment gel to combat the effects of drought on buildings

In order to tackle the worsening impacts of repeated droughts on soils and buildings, IFP Energies nouvelles (IFPEN) and Solinjection (Tabatabai Group), a company specializing in soil remediation services, joined forces to develop MAGELLAN®.

In gel form, this 100% mineral solution aimed at reducing the sensitivity of clay soils to drought-induced water variations offers a long-term, rapid, less invasive and economically more advantageous response than existing solutions, such as foundation repairs and polyurethane resin injection. Initially intended for use in individual houses, it is designed to address the critical problem of cracked buildings across France.

With the first projects already scheduled, IFPEN and Solinjection will present this innovation at the Viva Technology start-up and tech event.

Innovation incubated at IFPEN

The project arose from the second edition of the internal innovation challenge organized by IFPEN in 2019. The purpose of this challenge is to foster the emergence of innovative technological solutions or services aimed at addressing major societal challenges. In this case, an IFPEN research team came up with a solution to tackle the issue of settlement and swelling of clay soils associated with repeated periods of drought, causing cracks to appear in buildings. Their solution stemmed from research conducted for another application, namely the use of a silica fluid that gels to seal gas wells.

In order to co-develop and market this technology, IFPEN approached Solinjection for its expertise in soil

remediation and consolidation and knowledge of the expectations of the players in this market, including insurance companies, experts, engineering consultants and contractors.

“It is estimated that 10 million individual houses are located in at-risk zones today in France due to their construction on clay soil; a major challenge given the increasing frequency of droughts. With MAGELLAN®, we offer a solution with a number of advantages compared to traditional options. It significantly and definitively reduces the sensitivity of treated clay soils to dehydration and rehydration phenomena”, enthuses Laurent Forti, leader of the “Climate change adaptation” research and innovation program at IFPEN.

A sustainable, tested and protected solution

MAGELLAN® technology involves injecting foundation-bearing soils with a silica-rich solution that forms a gel, thereby creating new molecular bonds between clays, making them less sensitive to variations in water concentration. Following formulation research conducted in the laboratory at IFPEN between 2020 and 2022, tests carried out on real soils samples from across France demonstrated that the application of the MAGELLAN® gel considerably modified the properties of clay soils. In addition to the marked impact on the geotechnical characteristics of the soils treated, the teams observed a modification in their texture, evolving from a compact, plastic consistency to a more powdery texture.

The specifications for use of the patented MAGELLAN® solution, which were defined on the basis of these results, were validated by an independent control office. MAGELLAN® also comes with a ten-year guarantee issued by the insurer SMABTP at the beginning of 2024 and meets HP14 criterion eco-toxicity threshold requirements.

First concrete projects

In light of the impressive results of the various test campaigns carried out, 30 to 40% of clay soils previously treated with “heavy” solutions, such as underpinning, should be eligible for the MAGELLAN® solution. The first applications on individual houses built on clay soils to be treated will be carried out in the coming months, as part of a remediation program following the droughts of 2022. These projects will serve to demonstrate the effectiveness of MAGELLAN® in real conditions and will generate further invaluable data with a view to broadening its range of applications.

“By pooling our complementary expertise and knowhow, we have developed, in partnership with IFPEN, a major innovation in the field of soil remediation, in line with the market’s expectations in terms of effectiveness, sustainability, environmental protection and controlled costs. Thanks to a rigorous, patented process for impregnating foundation-bearing soils, MAGELLAN® offers the best guarantees for successful treatment of clay soils, and meets the expectations of insurers and property owners affected by drought-related damage. Our ambition is also to take this technology to the international market, targeting Europe, the USA and some countries in the Middle East. MAGELLAN® represents the joint commitment of IFPEN and Solinjection to an innovative, more sustainable solution to the problem of drought, and one that helps to significantly reduce the sector’s carbon footprint”, says Didier Richert, CEO, Solinjection.

The MAGELLAN® solution will be presented at Viva Technology, from 22 to 25 May in Paris, (Hall 1, Alley J, stand 09)

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About IFPEN

IFP Energies Nouvelles (IFPEN) is a major research and training player in the fields of energy, mobility and the environment. From scientific concepts in fundamental research to technological solutions in applied research, its activities revolve around innovation, based on four key priorities: climate, the environment and the circular economy; renewable energies; sustainable mobility; responsible oil and gas.

About Solinjection – Tabatabai Group

A leading player in the French soil treatment sector, Solinjection has specialized in foundation underpinning, slab lifting and the filling of underground activities since 2007. Solinjection is a subsidiary of the Tabatabai Group, which specializes in project management and engineering for building repairs, structural diagnostics, special works, emergency works, and construction and damage surveys. It works on behalf of insurers, experts, public and private contractors and engineering consultants.

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