red eléctrica



NATURE BASED SOLUTION: BIO-ENHANCING PROTECTION OF THE SUBMARINE CABLE BETWEEN LANZAROTE AND FUERTEVENTURA



INSTALLATION NOW INVISIBLE ON THE SEABED

One year after its installation there is no visible trace of the cable protection units on the seabed. Yet, there is a stretch of nearly three hundred meters between Fuerteventura and Lanzarote where the new cable connecting the two islands runs through a rocky bottom area. A trench of nearly half a meter deep had to be drilled, and today, it is protected by 480 pieces of bio-enhancing concrete that marine biodiversity has colonized in just a few months. The area's fauna and flora have reclaimed this path, leaving hardly any trace of human intervention.



THE ROCK TRENCHING CHALLENGE

When Red Eléctrica, the company that transports and operates the electric system in Spain, designed this 132kV submarine cable with a 14.5 km route under the waters between the two islands, its environmental technicians tried, as always, to make the route mostly pass through



sandy areas. According to Enrique López Fernández, from the technical team, "besides being more economical, it is much easier to carry out using the burial technique with high-pressure water jets called jetting, and, above all, it has a lower impact on the marine environment." However, after studying all possible alternatives, there was no choice but to cross a few meters of a rocky area where a trench had to be opened using the "rock trenching" technique.

SOLUTION: BIO-ENHANCING CONCRETE

When Red Eléctrica's environmental technicians involved in this project (in addition to Enrique, there was Amaya Ibarguren Salesse, responsible for projects in the Canary Islands), discussed this situation with Tecnoambiente, a consultancy that regularly advises Red Eléctrica, Koldo Díez-Caballero, its Head of Environmental Operations, proposed using ECOncrete technology to cover the trench. He was familiar with this bio-enhancing concrete technology as an innovative solution for the use of concrete in marine infrastructure. *"It is innovative,"* says Koldo, *"because it is a nature-based solution. In the past, to cover an open trench, they used concrete that was visible on the seabed. ECOncrete's concrete facilitates the adherence of organisms, usually sessile organisms, immobile on the bottom, which need a hard substrate to attach themselves with a kind of natural glue, whereas traditional concrete has more acidic substances that prevent good adhesion of these organisms." But that is not the only characteristic that the Tecnoambiente technician highlights: "Additionally, ECOncrete has a shape that imitates rock, which allows it to integrate very well into the underwater landscape."*



The concrete pieces installed in the project incorporate ECOncrete's patented technology, which includes a bio-enhancing additive, surface complexity, and a nature-inclusive design optimized for creating habitats for a wide range of organisms. ECOncrete is a Bluetech company founded by two marine biologists that already has more than fifty marine infrastructure installations in over ten countries, with results supported by numerous studies.

Koldo recalls the moment he proposed to Red Eléctrica the use of this material for cable protection in the trench section: "We needed a kind of cover because the electric cable runs through that trench and needs protection since any external damage it could suffer could pose a very serious problem for the electricity supply on both islands." This situation is usually solved by using traditional



concrete, bags, or rocks, which have a significant impact as their design is not optimized to encourage marine life to return to these structures. *"Then came the idea of using custom-designed ECOncrete pieces, and the truth is they were very agile. We, who carry out Red Eléctrica's marine supervision, were convinced by the solution, recommended it, and it also convinced them."* And so it was, pieces were designed (72cm long, 35cm wide, and 32cm high) adapted to the specific dimensions of the trench to fit perfectly. Just one month after the agreement, ECOncrete delivered the 480 pieces to their destination. These pieces are connected by ropes to prevent displacement due to wave action and marine currents, and their installation requires divers to place them into the trench. In this case, Type III/B cement (cement with blast furnace slag) was used in the production of these pieces, which has at least a 50% lower CO2 footprint.



A SUSTAINABLE INVESTMENT

Using ECOncrete's "eco-friendly concrete" technology initially requires a slightly higher investment compared to traditional concrete or rocks. In this case, since the decision was made while the project was already underway—meaning the pieces couldn't be manufactured on-site — and with a tight deadline, the cost was somewhat higher than usual. However, it was an affordable additional expense for a project of this magnitude, in which three hundred meters of cable are protected with this innovative material. Moreover, the integration of ECOncrete technology aligns with a company like Red Eléctrica's commitment to sustainability and minimizing environmental impact.

As Roberto Cabria, Environmental Technician at Red Eléctrica, points out, "there isn't yet a strong demand from society to avoid this type of impact on the marine landscape, but it's good to be proactive, and it has always been our concern to act accordingly." "For now," adds Amaya, "there isn't very active opposition, but we're aware that we'll have to work hard in this regard because there will be increasing demand." Currently, "it's the Administration that sets conditions for these types of projects, but the use of this eco-friendly concrete will eventually be required as it becomes more widely known and its results are verified," comments the head of Tecnoambiente.

TANGIBLE AND VISIBLE RESULTS

When discussing the results, the most compelling evidence can be found in the recently captured images. If one is not aware that the pieces are present, it becomes challenging to distinguish them



from the natural marine habitat. Moreover, there is a noticeable proliferation of species typical of the area's natural seabed structure.

For ECOncrete, this marks their second venture into protecting submarine cables, following their project in Fort Salonga, Long Island, NY (USA), which utilized concrete mattresses. This project also represents their first collaboration with a European Electricity Transmission System Operator (TSO).



A FOOTPRINT FOR THE FUTURE

Red Eléctrica now has experience in applying nature-based solutions, as well as the knowledge needed for implementation, an understanding of costs—with the previously mentioned nuances— and the ability to monitor results, as they do with all their projects. *"For each project, we carry out comprehensive environmental monitoring, including an environmental surveillance plan during construction, and once operational, a monitoring plan to track the evolution of all analyzed parameters,"* Amaya adds.

The Spanish electrical system operator and carrier will start construction on a cable between Tenerife and La Gomera later this year, and next year they plan another cable between Ceuta and the peninsula. Most notably, they face the challenge of constructing a cable from Bilbao to the French coast, at Cubnezais in the Aquitaine region, scheduled for 2027. When asked about the possibility of using ECOncrete technology again, Enrique López responds, *"We have this initial positive experience, and we trust that economies of scale will reduce costs, so we hope to rely on this technology in the future."*

For now, Red Eléctrica's submarine link between Fuerteventura and Lanzarote supports the energy transition on the islands by maximizing the evacuation of renewable energy in a safe manner for the system, while reducing dependence on fossil fuels and CO2 emissions. Furthermore, it aligns with the ecological transition by respecting biodiversity, which, along with decarbonization, represents one of the two fundamental pillars of this effort.





ABOUT RED ELÉCTRICA

Red Eléctrica is the sole transporter and operator (TSO) of the Spanish electrical system. As the backbone of the system, it guarantees secure, high-quality, and increasingly renewable electricity supply, operating under principles of transparency, objectivity, independence, economic efficiency, and a strong commitment to sustainable development. Currently, it manages 45,000 km of power lines. It is one of the five subsidiaries of Redeia, a global manager of essential infrastructure and a driving force behind the energy transition and universal connectivity, with a presence in Spain, Peru, Chile, and Brazil.

ABOUT ECONCRETE®

ECOncrete offers technology that fosters the integration of nature and increased biodiversity within maritime, coastal, and offshore infrastructure, creating a natural carbon sink through the colonization of the structure by living organisms.

The company has a multidisciplinary team consisting of biologists, engineers, designers, and concrete experts to ensure the seamless integration of technology into any project or application. To date, the technology has been incorporated in over 40 locations across 10 countries and six seas.

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