

Out of sight, out of mind

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Towering towards the sky, harnessing the earth's natural elements, wind turbine installations continue to spread across the globe. As the world moves towards net zero, the drive towards renewable energy will continue to grow exponentially. As the turbines themselves move further out of sight, keeping the potential for corrosion and other maintenance issues front of mind becomes even more important.



In 2021 over 93GW of wind energy was installed globally, with approximately 23% of that offshore and 77% onshore. This amounts to an estimated 27,000 wind turbines installed around the world. That is 27,000 new assets to be maintained and protected.

Since the year 2000, WTG's have evolved from generating capabilities of 0.5Mw each, to around 15Mw capability in each of the largest turbines currently being installed offshore. This is due in part to the greater surface areas that can be achieved by increasing blade lengths, systematically driving the increase in power generation, but it also means that the turbine heights may increase while the technology in the nacelle advances.

In addition, allowances must be given for country and terrain conditions to minimize disruption to wind flow caused by buildings,

mountains or other geographical factors that could impact power generation.

So with this infrastructure scaling such altitudes and heading further and further offshore, out of sight, out of mind is particularly true when it comes to corrosion protection.

In the North East corner of Curacao in the Caribbean Sea there is a wind farm where the first phase was constructed in 1993. Whilst being located just onshore of this idyllic island, the wind turbine generators have been buffeted by the warm winds since their installation nearly 30 years ago.

The wind turbines have been facing the perfect storm of warm, moist winds whipping up sands, constant waves and temperatures upwards of 35°C. This is a perfect recipe for coating damage and ultimately corrosion. The abrasive winds

have had the effect of shot-blasting the coatings and causing major damage.

The main areas of corrosion that require repair are the flange connections between the tower sections. These connections have been so seriously damaged by the environmental conditions that failure to carry out repairs will put into question their structural integrity. It is not unknown for wind turbines to collapse as a result of corrosion in these flanged connections.

Conventional paint coatings have been used before now, but they have not withstood even a third of their expected design life in this hostile environment. The paint can be re-applied in what is seen as a quick and easy fix, but the reality is the time and effort involved in doing so doesn't make it a cheap or quick solution.

Typically, paint requires a lengthy preparation process, involving surface preparation equipment, paints, brushes and then much of this must be disposed of as chemical waste in line with local environment regulations. Rope access equipment is inspected and installed, maintenance engineers are gathered and the work takes place. How many of these repairs, even when carried out to manufacturers specification, actually last their anticipated life?

What is the alternative?

In Curacao, as a result of the previous coating failures, the EasyQote range of products was selected to give the client a variety of options to carry out the repairs. The damaged surfaces were prepared to St2 standard by hand tool cleaning and then wiped down using alcohol wipes. A simple adhesion test was carried out to demonstrate to our client how successful the adhesion of the EasyQote products was going to be.

Two products were applied to the surface prepped areas of the towers. The grey EasyQote self-cleaning patches were applied circumferentially around the tower flanges giving a one-stop solution, halting corrosion in its tracks. EasyQote Basecoat was also applied around the flange connections, providing a solution where there were irregularities in the uniformity of the connections. The basecoat was then painted with WB Topcoat to the colour of the client's specification.

These repairs have now brought the coatings back into relevant specifications, securing asset integrity, and increasing the possibility of asset life extension and repowering if so desired.

It would appear that many other wind farms around the globe are experiencing similar issues with corrosion around the tower flange connections, due to harsh



Laura Hall

environmental conditions. EasyQote is currently also being applied to large wind farms across the coast of North Africa. These turbines have been exposed to abrasive winds off the Sahara, resulting in major coating failures.

How many other clients around the world have similar issues? These two examples will not be isolated occurrences. How many clients are opting for a quick coat of paint as a repair option, then being faced with exactly the same problem in a year's time? More and more clients are finding that with an unlimited shelf-life, EasyQote can offer a cost-effective solution to corrosion that is designed to outlive the life of the asset itself.

EasyQote is the latest evolution of technology from STOPAQ, the permanent corrosion solution first brought to market in 1983 as a sealing solution, followed by the WrappingBand technology in 1997. What this brings is a history of innovation and a track record of success.



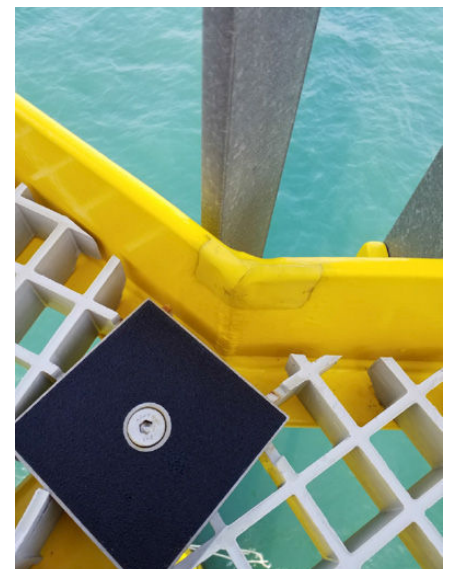
Charlie Watt

EasyQote is a polymeric coating designed with the concept that a corrosion solution could be applied simply as a sticker rather than painting or spraying. It is 100% plant based and therefore safe for both user and the environment as well as being simple to apply.

Its products have been deployed in multiple wind energy sites across the world. In fact, its products have now been included in the design and manufacturing specification for various end users as a provider of corrosion protection.

In action

Easy-Qote is establishing itself as a long-term corrosion solution in some of the toughest environments. The range of products has stopped corrosion from the monopiles and foundations, up to components in the nacelle. The unlimited shelf life of these products mean they can be used as and when any coating damage takes place either onshore or offshore. Any technician can carry out the coating repairs in minutes, stopping corrosion in its tracks.



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In 2016, EasyQote yellow self-cleaning patches were installed offshore in the North Sea on damaged wind turbine foundations. The pictures you can see here were taken in 2022, when the site was revisited. As you can see, the self-cleaning patches are as good as the day they were installed, with no UV degradation.

In 2015, a central European fertilizer plant was having major issues due to the corrosive nature of the atmospheric conditions on site and the products being handled. Mechanical handling equipment used to transfer materials around the site was constantly failing due to corrosion. These costly but vital pieces of machinery typically only had a lifespan of two years on site. The decision was taken to protect the equipment in EasyQote, and eight years later the same piece of equipment is still going strong.

In Croatia, local authorities were having issues with street lighting poles failing and collapsing. The bases of the lighting poles were corroding through a combination of poor specification, inclement weather, lack of maintenance, gritting of roads and interference from dog walkers. The decision was taken through discussions with the local authority to coat the base of the lamppost using EasyQote Paste, Basecoat and WB Topcoat. The use of these products stopped the corrosion in its tracks, and eliminated the potential of further failures.

Across the globe operational and maintenance priorities tend to be focused on keeping plants and equipment functioning. Statutory and regulatory inspections tend to be next on the priority list. All other maintenance requirements will then battle for the remaining budgets. But are these remaining budgets being allocated appropriately? What about the issues that are out of sight, out of mind?

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