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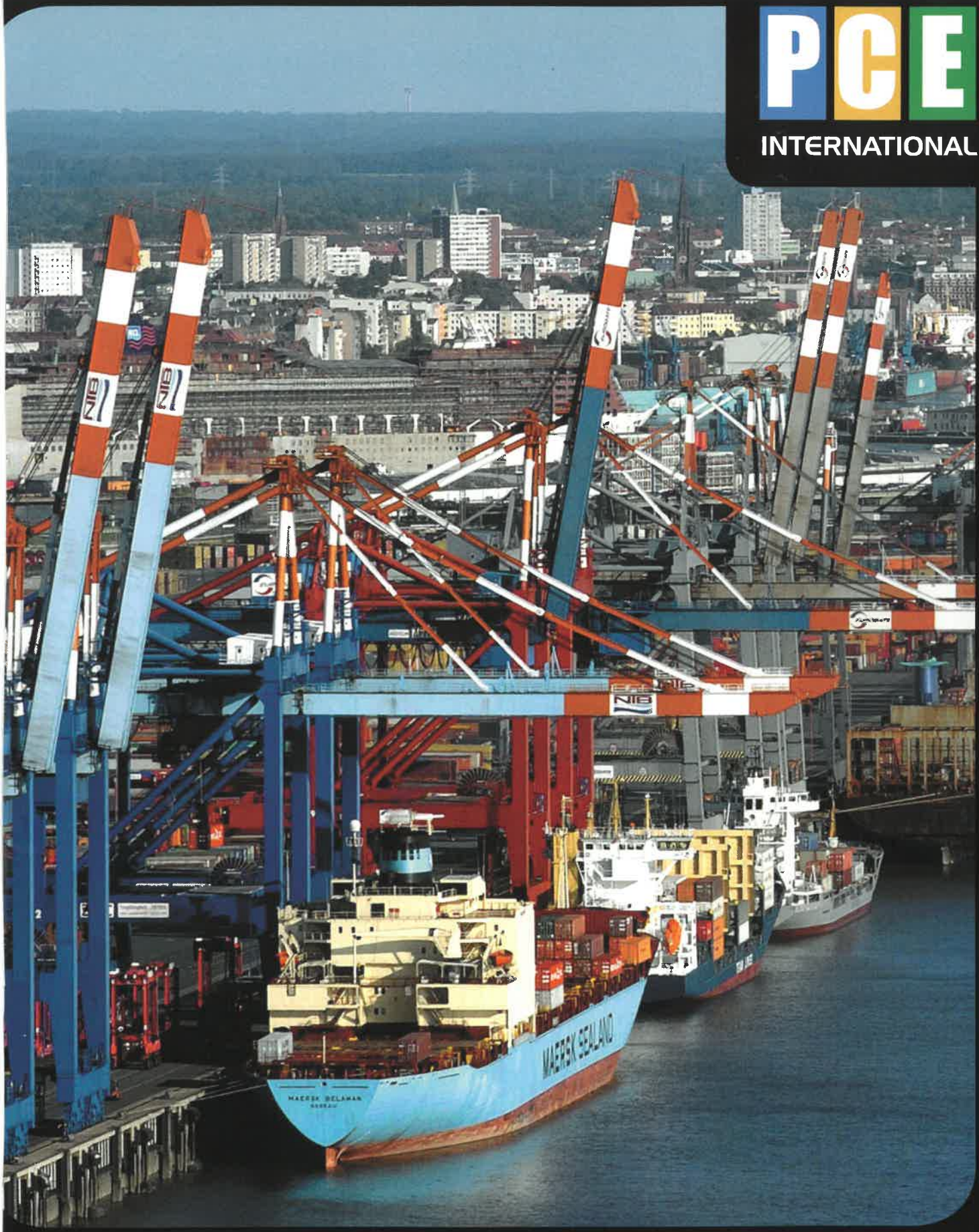

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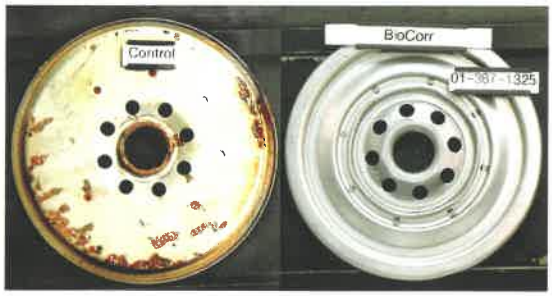

Above: A comprehensive study on Cortec's BioCorr rust preventative was conducted in collaboration with the Laboratory for Materials Protection at the University of Zagreb

Several raw materials employed in the production of conventional anticorrosion coatings pose severe threat to environment and human health. The hazards have led to surge in government regulations that have restrained anticorrosion coatings market growth. Global market trends are moving towards sustainable and renewable materials as the public is becoming more aware of importance of utilising environmentally safe solutions. Thankfully, dedicated and extensive research has enabled Cortec to create solutions that successfully replace hazardous chemicals.

Biobased coatings are rapidly gaining market share due to their low cost, effectiveness and excellent environmental profile. Traditional petroleum derived rust preventatives require expensive degreasers and hazardous disposal methods. Biobased products are inherently biodegradable, and in most cases do not require removal before painting or welding, providing a far more economical solution.

BREAKTHROUGH FORMULATION

BioCorr rust preventive is a breakthrough formulation created in Cortec laboratories. It is a water-based, bio-based solution, intended for preservation of metals in storage and during transportation. Unlike rust preventative oils, this product leaves a dry film on the surface of the metal that is virtually undetectable. This feature helps to create a clean workplace and prevents material waste. BioCorr is also biodegradable, eliminating expensive disposal costs associated with oils.

As a leader in innovative and safe corrosion protection technologies, Cortec is able to offer ecologically safe corrosion control solutions whose performance has outgrown conventional rust preventatives. Not only are these bio-based environmentally safe alternatives functionally superior to conventional petroleum derived products, but they provide a far more economical solution. In addition to offering end-users an excellent environmental profile, and superior corrosion protection, BioCorr is typically 40 percent less expensive than the traditional petroleum derived RP's!

Extremely corrosive environments call for extremely durable structures

A Comprehensive study on Cortec's BioCorr rust preventative was conducted in collaboration with the Laboratory for Materials Protection at the University of Zagreb. The paper covers the economic and environmental impact of traditional rust preventatives versus bio-based product.

The study includes a comparative experimental investigation of biobased and petroleum based rust preventives in a humidity chamber, with the corrosion protection efficiency being determined using various polarisation techniques. This research paper clearly demonstrates that bio-based products may inhibit corrosion as well as their traditional oil-and solvent based counterparts, without any of the negative environmental considerations. The latest scientific evidence of BioCorr's performance will even further strengthen the value that Cortec brings to its customers.

BIO-BASED EXAMPLE

Extremely corrosive environments call for extremely durable structures. This is especially true in the Middle East, where reinforced concrete is under attack from many angles. Near the coast, salt spray may attack reinforced concrete structures above ground. Below ground, locations with high water tables can expose concrete foundations to harsh groundwater of greater salinity than seawater. Even Sabkha soil can be a problem, with mineral deposits creating soil three times as saline as seawater. These high chloride environments can easily begin the corrosion process on embedded rebar. When the rebar rusts, it causes expansion, leading to concrete cracking, spalling, and deterioration.

To combat these corrosive elements and extend the service life of structures, a number of new structures in the Middle East have been using Cortec's MCI-2005 as a concrete admixture. This is a Migrating Corrosion Inhibitor (MCI) that travels through concrete to form a protective molecular layer on embedded rebar. It consists of a mixed inhibitor that will protect the rebar at both the anode and the cathode of a corrosion cell. In addition to providing durability, MCI-2005 is safer and more sustainable, being made from 67% bio-based content (a USDA Certified Biobased Product) and NSF Standard 61 approved for use in potable water tanks.

While durability is important for almost any concrete structure, it is certainly an issue where the world's tallest building is concerned. At 828m (2,716 feet) high, Burj Khalifa Tower in Dubai, UAE, must be supported by a base of 192 piles descending more than 50m underground. This foundation is exposed to harsh groundwater. As the building designers looked for materials that would help Burj Khalifa achieve a 100-year service life, they chose MCI-2005 out of a number of products evaluated for use in the substructure. MCI-2005 would give the substructure added protection from its exposure to extreme chlorides in the groundwater, increasing the service life of this critical foundation, and in turn helping to sustain the rest of the tower.

By using MCI-2005 in severe environments like those surrounding Burj Khalifa, buildings will have a stronger resistance to corrosion and therefore possess greater durability. Increased durability will mean fewer repairs, greater structural integrity, and a longer service life, all

leading to a more sustainable structure with the use of MCI.

MCI-2005 conforms to the following standard test methods: NSF Standard 61 by UL (Potable Water Applications Approval), ASTM D-6866-11 (Determination of Biobased Content), and CC-022 (Electrochemical Impedance Testing).

While durability is important for almost any concrete structure, it is certainly an issue where the world's tallest building, the Burj Khalifa Tower in Dubai is concerned