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НА ЗАЛІЗНИЧНОМУ ТРАНСПОРТІ»**



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## **THE RELEVANCE OF INCREASING THE CORROSION RESISTANCE OF CONCRETE AND REINFORCED CONCRETE STRUCTURES UNDER EXPOSURE TO SEA WATER**

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Designing concrete structures that are resistant to seawater is of great importance for the global construction industry. Seawater causes corrosion of reinforcement and deterioration of concrete properties [1]. The use of corrosion-resistant materials ensures a long service life of offshore structures, reducing the need for frequent repairs and reconstruction. This is especially important for infrastructure facilities that must operate continuously and without significant interruptions for repair work.

It is also important that corrosion of metal elements in concrete can lead to pollution of seawater. Reducing the corrosion of metal elements in concrete helps reduce the risk of pollution of the marine environment with heavy metals and other harmful substances. Corrosion-resistant materials help preserve coastal ecosystems. Due to climate change and rising sea levels, the need for offshore structures that are resistant to aggressive conditions is growing. This allows the infrastructure to adapt to new conditions and minimize the risks associated with climate change.

For China specifically, the development of corrosion-resistant materials is of great importance, as China is actively developing its seaports, docks, piers, breakwaters and other coastal infrastructure facilities. In addition, China is building artificial islands and other structures in the South China Sea [2]. The conditions there are very aggressive due to the high salinity of the water, which makes corrosion-resistant materials necessary to ensure the long-term operation of the facilities.

Thus, the development of seawater-resistant concrete structures is an important step to ensure the durability, cost-effectiveness, safety and environmental sustainability of the construction industry.

[1] Mangi, S.A., Makhija, A., Raza, M.S. et al. A Comprehensive Review on Effects of Seawater on Engineering Properties of Concrete. *Silicon* 13, 4519–4526 (2021). <https://doi.org/10.1007/s12633-020-00724-7>

[2] Zhao H., Wang L. Construction of Artificial Islands on Coral Reef in the South China Sea Islands (2017) *Tropical Geography*, 37 (5), pp. 681 - 693, Cited 12 times. DOI: 10.13284/j.cnki.rddl.002974