**Abstract**

The doctoral dissertation presents the results of research on the impact of water-dispersible epoxy resin admixture on the durability of concrete in aggressive environments, with particular emphasis on sulfate and leaching corrosion. Sulfate corrosion is a significant issue in wastewater infrastructure, while leaching corrosion affects water and land drainage structures.

The main research hypothesis of the study is: „The addition of water-dispersible epoxy resins can increase the resistance of concrete to aggressive environmental influences and extend the service life of concrete elements used in the construction of wastewater and drainage infrastructure." Based on this hypothesis, epoxy resins were proposed as a key agent to enhance the chemical resistance of concrete, given their high strength properties and resistance to chemical degradation, particularly of biogenic origin.

The research plan included the investigation of selected physicochemical properties of concrete with an epoxy resin admixture, as well as studies on the resistance of concrete to aggressive environments. The experimental program was divided into laboratory tests and in situ tests. In the laboratory, experimental setups were created to evaluate corrosion caused by sulfuric acid, leaching, and carbonation. The in situ tests were conducted in a wastewater pumping station tank, where concrete samples were exposed to high concentrations of hydrogen sulfide and carbon dioxide, monitored by installed sensors. The unique and practical value of this testing setup is a significant aspect of the research.

The results were analyzed statistically, and both qualitative and quantitative evaluations were conducted, using techniques such as X-ray diffraction and scanning electron microscopy. The findings confirmed the research hypothesis, demonstrating that concrete with the epoxy resin admixture exhibits enhanced resistance to aggressive environmental influences. Sulfate and leaching corrosion processes were significantly slowed, as verified by statistical analysis and chemical and surface examination of the samples.

**Key words:** water-based epoxy resin, sulphate corrosion, leaching corrosion, concrete resistance