

Environmental Research, Technology Demonstration and Conference Project

ECF Project:	ECF 2022-117
Project Title:	Environment and Conservation Fund - Durability Evaluation of Slag-Based Recycled Aggregate Geopolymer Concrete for Coastal Structures in Hong Kong
Principal Investigator:	Dr Deng Xiaowei, Department of Civil Engineering, The University of Hong Kong
Total Approved Grant:	\$474,824
Duration:	1/10/2023 to 30/9/2025
Project Status/Remarks:	On-going
Project Scope:	<p>More than one-third of the solid waste in Hong Kong is construction waste, and slag is a waste material from steel manufacturing. Solid waste dumping can significantly impact the surrounding environment. Exploring the reusability of construction and steel slag waste is meaningful in two aspects, minimising the need for dumping and reducing the usage of cement, which contributes almost 8-10% of total carbon dioxide emissions globally. And it also aligns with the Hong Kong government policy regarding "waste reduction." Hong Kong is along the coastline, and most coastal structures are directly exposed to the harsh marine environment, making them susceptible to chloride-induced corrosion. As geopolymer concrete (GPC) is a relatively new material, its durability performance is not well understood, especially when prepared with recycled aggregate due to the alkali-silica reaction. This study will perform the durability evaluation of slag-based recycled aggregate GPC (SRAGPC) in a harsh marine environment, which will be thoroughly explored in terms of mechanical and durability performance. The aim is to obtain an optimum mix-design, considering the workability, curing duration, uniaxial compressive strength, flexural strength, and chloride-induced corrosion resistance. Finally, microstructure characteristics will be examined to identify the parameters that influence the mechanical and physical properties of the SRAGPC.</p>
Summary of the Findings/ Outcomes:	To be available upon completion of the project