Research Project
研究項目

The Hong Kong Polytechnic University 香港理工大學

Enhancement of marine biodiversity and ecosystem functioning along Lantau eco-shoreline with low-pH sea-sand seawater eco-engineered seawall panels

利用低pH值的海砂海水生態工程海堤板提高生態海岸的海洋生物多樣性和生態功能化

Along the Lantau shoreline, the northwest Lantau eco-cultural corridor and south Lantau Eco-recreation corridor have been planned to promote conservation and an eco-friendly lifestyle. The aims of these corridors include public involvement and enjoyment, and environmental protection and enhancement. To address the aforementioned aims, this project proposes to develop novel eco-friendly concrete mixes and then to test alongside an eco-engineered panel (with an ecologically inspired design) on a vertical seawall along the corridors to enhance marine biodiversity and ecosystem functioning.

In this proposed project, novel low-pH eco-friendly concrete mixes prepared with recycled wastes, seawater and sea sand will be locally developed and evaluated. They will incorporate local waste materials (e.g., incineration sewage sludge ash from T-Park (ISSA) and glass powder (GP) from recycled glass bottles) and local materials (e.g., sea sand and sea water), and thus promote sustainability. The novel design of the eco-engineered panel will include holes that pass through the panel to provide habitats of marine species, as well as reducing the weight of the panel for better implementation. The biodiversity enhancement of the eco-engineered panel with the best eco-friendly concrete mix will be monitored and evaluated against conventional concrete panels and the original vertical seawall.

在大嶼山沿岸，已規劃了西北大嶼山生態文化走廊和南大嶼山生態康樂走廊，基於此以促進保護和生態友好型的生活方式。這些走廊的目的是為了公眾參與和享受，環境保護及改善。為了實現上述的目標，該項目提出開發新型的環保混凝土材料，然後在垂直海堤的生態工程面板中相結合（具有生態靈感設計）進行實踐，以此來增強海洋生物多樣性和生態系統的功能化。

在此項目中，將對利用本地回收廢物，海水和海沙製成新型的低pH值環保混凝土材料，並進行評估。其所將結合的是當地的廢物材料（例如，來自T-Park（ISSA）的焚化污水污泥灰和來自回收玻璃瓶製備的玻璃粉（GP））和當地的材料（例如，海砂和海水），從而最大限度地促進材料可持續性。實際應用的生態工程面板的新穎設計在於不同大小穿過面板的孔，以提供海洋生物的棲息地，並減輕面板的重量，以更好地在實際工程中實施。而且將對比與傳統的混凝土板和原始的垂直海堤，對具有最佳環保混凝土組合的生態工程板的生物多樣性進行監測和評估。