



Utilization Trends of MARPOL Compliant Waste Reception Facilities by Ships Visiting Major Sri Lankan Ports

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Under the MARPOL Convention, which is intended to reduce maritime pollution, it is mandatory that ports along their routes must have adequate facilities to receive ship generated wastes, where MARPOL categorized as oily waste (Annex I), hazardous and noxious liquid substances (Annex II), sewage (Annex IV), and garbage (Annex V). The aim of the study examines trends analysis of ship-generated waste, at the Sri Lankan major ports of Colombo, Hambantota, Trincomalee and Galle over five years period from 2020 to 2024. Secondary data of ship generated waste amounts are obtained from the Marine Environment Protection Authority's Waste Reception Services (WRS) system for the analysis. The dataset included quantities of oily bilge water, oily residues, oily tank washing, sewage, plastics, food waste, domestic waste, operational waste, incinerator ash, e-waste, and cargo residues (Hazardous to the Marine Environment and non- Hazardous to the Marine Environment). A quantitative trend analysis of waste was performed using the non-parametric Mann–Kendall test. The results indicated no overall trend in waste at all ports studied, despite year-to-year variability in waste quantities. Trend analysis showed that for Colombo Port there were significant increases in the amounts of plastic waste ($Z=2.20$) and electronic waste ($Z=2.20$) over time, and Galle Port there was a significant decrease in the amount of food waste ($Z= -2.2$) and an increase in incinerator ash ($Z= 2.20$). According to the results highlight that port reception facility capacity and waste management practices need to improve, particularly for plastic and electronic waste in Colombo port and incinerator ash in Galle port, to support sustainable maritime operations in Sri Lanka.

Keywords: *Ship-generated waste, MARPOL Annex I–V, Waste reception facilities, Sri Lankan ports, Marine pollution*