Slippery Mess: Macroplastic Pollution in Slipways at the Port of Ostend

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Marine litter has become a growing issue of environmental concern, globally. Marine litter refers to any processed or discarded item that has been deliberately or accidentally discarded, disposed of, or abandoned, ending up in the marine environment. Plastic litter, which is the most persistent litter, makes up approximately 80% of all marine litter, a result of the expansive usage of plastics in everyday life, their affordability, versatility, ease of production and durability in the environment. Plastic litter has the potential to pose major threats to ocean and human health including entanglement, suffocation, and injuries to marine organisms, reduced aesthetics of the landscape and the breakdown of macroplastics to microplastics which may affect biota. Understanding the fate of plastics in the marine environment is essential, to assess the current state or level of marine plastic pollution and provide necessary information to implement suitable mitigation measures. Information about the accumulation zones and rates in and around port banks, for example, is required for port managers to take action and implement proper waste management solutions. The Port of Ostend is located along one of the busiest shipping routes in Europe, hosting a wide range of commercial ships and fishing vessels. The all-year-round seaport activities can however result in the gradual accumulation of various types of debris, either from land, the port itself or from the sea.

This study, in the scope of the Plastic Flux for Innovation and Business Opportunities in Flanders (PLUXIN) project, aimed at quantifying and characterizing plastic litter on four slipways (the Marine Station Ostend (MSO), Fisheries, Ferry and Eastern stretch dam (beach) slipways) at the port of Ostend during the summer of 2021, to get a better understanding of the type, sources, accumulation rate and polymer content of plastic litter. The Oslo/Paris Convention (OSPAR) Commission Guideline for Monitoring Marine Litter was the protocol used for this study. The initial standing stock of plastic litter was quantified, followed by an accumulation survey, conducted twice, with a two-week interval. All site descriptions and conditions were recorded, as additional information that could influence the amount and type of litter at the slipways. The litter collected was sorted into different OSPAR litter categories, counted, weighed, brand audited, and the data recorded. In the laboratory, the polymer content of the plastics was analyzed, using the Fourier Transform Infrared Spectroscopy (μFTIR) machine. Results indicate that geographical location, in relation to wave and wind dynamics influences litter accumulation rate at the study site. The more exposed slipway, beach slipway, had the least amount of litter (0.05 ± 0.008 items/m²) while the less exposed fisheries slipway had the highest litter count per slipway with a total value of 36.75 ±10.07items/m² and the highest accumulation rate of 225.3 items/day. The dominant polymers in the plastic items were Polyethylene (54.9%), Polypropylene (39.2%), and Polystyrene (39.2%). We observed evidence of human influences, with the deliberate discarding of plastics and cigarette butts at the Ferry slipway, COVID-19 waste deliberately abandoned or brought in by currents and wind, while discarded fishing ropes and nets were found tied on rocks and boulders at the Eastern stretch dam slipway.

The brand audit indicated that the dominant litter sources were from European countries (46%), International sources at 30% while 24% originated from Belgium. Fishing gears made up 21.1% of the total litter collected. The COVID-19 pandemic has introduced new types of waste such as covid masks, disposable gloves and disinfectant gel and it is advisable to include them in monitoring protocols and the available management strategies.

Our research only comprised of two months of data collection, but based on the protocol we followed and fine-tuned, long-term observations could be performed in a systematic way. Information about the types of marine litter, their quantification, and identification of pollution hotspots can support tailor-made waste management strategies to mitigate pollution not only on the port of Ostend, but also in other coastal ecosystems and seaports.

Keywords: Marine litter; Macroplastics; Plastics; Pollution; Ocean and human health; Slipway; COVID-19; Port of Ostend