Polymeric System for Tanker Ships to Prevent Oil Pollution in the Sea

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A large volume of oil and its derivatives are routinely disposed in the sea during the washing processes performed in oil cargo ship tanks. This occurs because after the tanks are unloaded in seaports, the remaining oil needs to be washed out and removed.This project improves the process by preventing oil to stick to the tank walls and allowing it to be collected more effectively, therefore resulting in less loss of material and reducing environmental impact. For this reason, we developed an internal tank coating using a polymer that has an aversion to non-polar oils. This solution brings high profitability on medium to long-term use by avoiding oil residues as well as high environmental fines. We conducted several experiments (in triplicate to ensure repeatability) to verify the polymer fixation on steel surfaces as well as to test oil adherence on the polymer. The polymer was shredded into small pieces to increase the contact surface and to facilitate solubilization by the propanone solvent. The solution was spread on the metal surface and left at rest until the complete volatilization of propanone. Two plates have been used for testing, one with the coating and the other without the coating, with angles that simulated the tank conditions (45º, 90º and 170º). The same weight of oil was applied on both plates during the same amount of time to verify how much oil would be retained in each one. The experiments show that solubilized polymer adheres well on the plate, confirming its feasibility on steel surfaces applications. Besides, tests have confirmed that about 9.5 times less oil was retained on the coated plate compared to the uncoated one.

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