Oil Retrieval System Using Selected Philippine Fibers for Remote Sensing Surface Vehicle

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Oil spill causes serious depletion to marine life around the world. In the Philippines, managing oil spill remains a challenge due to unexplored technology for clean up and retrieval. This study develops a portable and remote sensing surface vehicle that absorbs and retrieves oil to address spills.The device works with Arduino and sensors and can be controlled using a smartphone. Selected Philippine fibers such as Loofah and Coconut Husk sorbent blankets were incorporated in the surface vehicle as oil absorbing mechanism of the device. Oil retrieval was executed through its squishing and recovery mechanisms which also sent Line of Sight (LoS) Notification to user when 1kg of oil was collected. After testing in crude, diesel, and vegetable oil spill simulations, the device with loofah exhibited (2.82, 2.83, and 2.80) absorbing capacity(kg), (2.58, 2.50, and 2.53) removal rate(min), and (88, 89, and 90) recovery(%). Furthermore, with Coconut husk, the device revealed (1.78, 1.81, and 1.74) absorption capacity(kg), (3.36, 3.27, and 3.41) removal rate(min), and (55, 60, and 64) recovery(%). Additionally, both fibers have satisfactory tensile properties and reusability efficiency until 6-cycle.These translated to 45.36%(Loofah) and 40.26% (Husk) performance amplification for clean-up. The device proved suitable operational distance, revolution/minute range, and 90%-95% detection/notification accuracy. Therefore, the system proves its functionality for spill response highlighting retrieval of reusable oils, making it a more efficient and low-cost method for spill management. Keywords: Oil retrieval, Oil spill, Surface vehicle, Arduino, Philippine fibers