Underwater ROV Propulsion

Yamada, Alex
Schlitzkus, Eric

Propulsion created by motors can be affected by numerous factors. Information about this topic is vital, in order to remain energy and cost efficient, while researching maritime heritage, marine organisms, and nautical transportation. However, the efficiency of underwater propulsion will not be improved without the further understanding of motors, shrouds, and propellers. The purpose of this project was to use a Remotely Operated Vehicle (ROV) to test how motor orientation and the addition of shrouds affect propulsion. Propulsion is the act of driving or pushing forward. The first hypothesis was if the motors of a ROV are parallel, then they will perform the most efficiently because both motors will be producing thrust in the same direction. The second hypothesis was, if a shroud is placed over a motor, then the performance of the motor will increase. However, if the length of the shroud is too long, then the ROV's efficiency would decrease because the shroud will create an immense amount of drag, causing the ROV to slow down. These hypotheses were tested by changing motor orientations and constructing shrouds of different lengths. The motors were adjusted with PVC joints and the shrouds were constructed using PVC pipes and hose clamps. The results showed that the optimal configuration for motors was a 45 degree tilt inward with 2-inch shrouds, which performed 8.4 percent faster than our control test, with the ROV having no shrouds and motors parallel to each other. This experiment tested the two hypotheses and found that shroud lengths greater than 2-inches long began to decrease the efficiency of the ROV.