Abstract

Amr A. Mohamed Mohamed Hassan

A Minimum Cost Design Approach of an ROV for Underwater Inspection

A minimum cost design approach of an underwater remotely operated vehicle ROV is described in this paper. The “Sea Explorer I” was designed for general purpose underwater inspection and/or research work with a design depth of 20 meters. The approach is a hand on approach and focuses on minimizing cost. Use of costly commercial watertight motors and thrusters for propulsion was avoided. Conventional low cost DC motors were used instead and were made watertight via manufactured underwater housings, seals and gaskets. An underwater camera system was implemented using a low cost security camera such as the one found in convenience stores. The buoyancy system uses a pneumatic system that fills in a float with air thus providing dynamic buoyancy control from the surface. Stresses on the motor housing resulting from pressure and thermal heating were investigated using the finite element method FEM and the ANSYS software. Underwater hydrodynamic performance of the ROV including resistance, motion and dynamic pressure effects were investigated using the finite volume method and the FLUENT software