

**SLURRY PUMPS IN DEEP-SEA MINING: A REVIEW OF NUMERICAL AND EXPERIMENTAL STUDIES**

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**Abstract**

Slurry pumps have played a significant role in the technical framework of deep-sea mining system. In recent years, different forms of slurry pumps have been developed for slurry transportation in the procedure of commercial mining, the volute type, the radial diffuser type, the bowl diffuser type, and the diaphragm pump, etc. Following the research status, the slurry pump with bowl diffusers has been considered to be the optimal form, still it has potential risks in the wear and blockage, resulting in mechanical and hydraulic failure. Among these, the complicated two-phase flow of coarse particle-sea water inside these pumps is the most important issue, which is influenced by geometric, operating, and media parameters. The application of numerical simulation enables the researchers to enhance their comprehension of the mechanism of the complicated two-phase flow in pumps. The main motivation for this paper is to present a comprehensive review of researches available in the literature on slurry pumps and its corresponding experiments. The investigation progress and experiments forms of slurry pumps for deep sea mining were summarized in the paper, the influence of different parameters on pump performance and flow pattern of two-phase flow inside the pump were discussed, and the future direction that may promote the development of commercial deep sea mining was suggested as well. The paper can provide theory and engineering support for development of deep-sea mining slurry pumps.

**Keywords:** Deep-sea mining, Solid-liquid two-phase flow, Centrifugal pump, Slurry pump

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