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The Method and Error Analysis of Deep-sea Pose Measurement System

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Abstract: The deep-sea pose measurement system can measure the relative distance and angle of two subsea pipelines which the connection of submarine pipelines project need, and the success of connection is mostly decided by high measurement accuracy. According to deep-sea environment, paper designs a measuring method by deep-sea pipeline pose measurement system which bases on the stretching wire. In order to increasing measurement accuracy, paper analyses the transitive relation of error source which impact system measurement accuracy, and gets the impact laws of error sources which include the orthogonal angle, extension arm vertical pitching angle and horizontal swing angle, etc. We revise the measuring result by binary linear regression analysis to improve the measurement accuracy. Through constructing the test platform, we compare measuring value and true value of the pipelines pose parameters. The experimental results show that the distance error is ±30mm inside, and that the angle error is ±0.7°inside within 7m after correction. We reduce the measurement error of the pose measurement system, and verify the correctness of the theoretical.

Key words: Deep-sea pose measurement; error correction; binary linear regression analysis; experiment.

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