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## **An Image Analysis Approach to the 3D Position Measurement of Riser End**

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**Summary:** Re- entry operation is requested to make the connection of the riser end with the bottom platform (BOP). In re-entry operation, the relative position between the riser end and the bottom platform should be measured. To facilitate re- entry operation, the paper presents an image analysis approach that is convenient to measure the relative position between the riser end and the bottom platform with a single waving camera installed on a ROV. In the image analysis approach, and the targets of the riser end and the bottom platform are recognized from the obtained image by matching the shape models of targets, and the shape regions of targets are highlighted. In the shape regions, the position of riser end referred to the camera, and the orientation of camera referred to the bottom platform, are calculated from circle marks on the tabs attached on the riser end and the bottom platform. Also the relative position between the riser end and the bottom platform can be got thereby, not influenced by the orientation of the waving camera. To check the accuracy of the image analysis approach, the experiments were carried out, and the results are shown in the paper. To test the applicability of the approach to the riser end survey, the model experiments of re- entry operation in water tank were carried out also, and the successful results are shown in the paper.

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