

5. CONCLUSIONS

In this paper, we could comprehend a deformation of the large industrial products in a small factory by using TS and target seal. Since a measurement speed was improved particularly with measuring precision, we could clarify a deformation in each process which was not frequently carried out up to the present. Furthermore, setting a measurement point at end part in component as a reference point of coordinate conversion was valid to comprehend a deformation tendency for hull component in each process. By executing a conversion by each block in particular, there was no influence on the deformation volume for a deviated measurement point when a measurement point as standard was largely deformed or inclined. It would be required to examine an application method for process improvement based on PDCA cycle in terms of deformation volume by each welding process selected for the working procedure. Specifically, it is necessary to examine a difference between design drawing (CAD) and final deliverable and also a reflecting method for design or work process.

6. REFERENCES

- Nomoto, T, et al., 1997, Basic Studies on Accuracy Management System Based on Estimating of Weld Deformations, *Techno marine: bulletin of the Society of Naval Architects of Japan*, 181, pp. 249-260.
- Takechi, S, et al., 2000, Studies on the Block Positioning Metrics System for the Hull Erection Stage, *Techno marine: bulletin of the Society of Naval Architects of Japan*, 188, pp. 399-408.
- Hiekata K, and Matsuo, A., 2012, Application to shipbuilding industry of the three-dimensional measurement, *KANRIN*, 40, pp. 2-5.
- Ono, T., 2012, Lecture 6 Bundle adjustment: Bundle adjustment and the camera calibration in precision industrial measurement, *Photogrammetric Engineering & Remote Sensing*, 51, pp. 387-396.

7. ACKNOWLEDGEMENTS

Measurement experiment field was kindly provided to IWAKITEC Co., Ltd.