

Evaluation of Lapping Mechanism by Visualization of Abrasive Grain

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Evaluation of Lapping Mechanism by Visualization of Abrasive Grain

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機械工作・生産工学

Research Institution

Kanazawa University

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Visualization / Lapping / Movement of abrasive grain / Finite Element Method / Lapping Mechanism / Image Processing

Research Abstract

The evaluation of the movement of abrasive grain by the technique of the visualization is extremely significant for the evaluation of the machining mechanism in the lapping because the workpiece is machined by the movement of the abrasive grain in lapping fluid which flow between lap and workpieces. Also, the movement of the abrasive grain is divided into the movement in the groove on a lapping plate and a movement on the surface

of lap. The movement process of abrasive grain in the groove is investigated in this study.

The movement of abrasive grain in groove on a lapping plate with square groove is two-dimensionally reproduced using the proposed technique of visualization. The observation result shows that abrasive grain inflowing in square groove moves along the wall of the groove. The movement process of abrasive grain in square groove depends on the velocity of abrasive grain inflowing in groove. Also, the velocity of abrasive grain is calculated by the images of movement of abrasive grain in the groove. On the other hand, the the two-dimensional flow on lapping plate with square groove is estimated by finite element analysis. The analyzed velocity distribution of abrasive grain in groove is approximately equal to the velocity which is obtained by the visualization of the movement of abrasive grain in the groove. Also, the effect of the groove on lapping mechanism and the most suitable process of the movement of abrasive grain in the groove are investigated from the analysis and visualization results.

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