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# Simulation Analysis of Surface Deformation Due to Newly Design Optical Mounting Using Numerical Model

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Flatness is one of the key components that determine quality of the mating parts. It also can be used to interpret performance of the production process or the machine tools. Orientation and fixture used in holding the object also affect flatness of the surface. This paper investigated effect of the mounting configuration to flatness of the flat surface. Flatness of the optical flat diameter 300 mm was experimentally measured using phase shifting Fizeau interferometer which is equipped with the He-Ne laser generating a single wavelength illumination and phase shifter. Phases of the interference pattern were determined from the 9-steps phase shifting algorithm developed by D. W. Phillion. The optical flat was hold horizontally using optical mounting. This optical mounting was designed that supporting position and clamping force can be varied. The experimental result and the simulation result from the finite element method (FEM) were compared. The clamping force was found to be directly related to the deformation scale of the flat surface. Both experimental result and the simulated result were found to be well correlated which confirmed trueness of the simulated result. The finite element was conducted further in order to confirm the newly designed optical mounting and to investigate effect of the holding position. The designed optical mounting equipped with 13 supporting positions which diameter of the workpiece can be adjusted from 150 mm up to 330 mm. Optical flat made from quartz, diameter 300 mm and thickness 50 mm, weights approximately 10 kg. The analysis result strongly indicated the improvement of the deformation of the surface by factor of 2.

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