

An application of Reflective Holographic Gratings for measurement of cylindrical curvature

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Abstract

This paper presents an application of reflective holographic gratings for the measurement of cylindrical curvature. The surface of fabricated holographic grating was coated with gold by the sputtering method, where it becomes a reflective holographic grating. The grating was attached to the surface of various radius cylindrical objects. The diffraction pattern produced by the bent grating with different radius was observed by illuminating a laser beam normal to the surface of the grating, where the grating constant corresponding to that of the radius. The gratings constant were calculated from the observed diffraction pattern. The relationship between the grating constants and the radius of cylindrical objects is obtained. Experiment results show that the grating constant and the reciprocal of the radius of cylindrical objects is a linear relationship, with the least square between 0.85-0.97. Moreover, it was found that the y-intercept is consistent with the grating constant of the non-bended grating. In conclusion, we can apply this method to measure the radius of cylindrical objects.