

Analysis of Surface Roughness Using Laser Optical Imaging Techniques

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Abstract

Speckle phenomena were produced by using interference of scattered laser beams from certain rough object. Digital speckle images were recorded for different rougher and smoother surfaces, using an optical imaging system in two and three dimensions with a high resolution CCD camera. The obtained speckle images were transformed to equivalent binary images. The values of surface roughness depend on the degree of agglomeration of the speckle images. The optical density was calculated and it was found that it depends on the different conditions for the optical imaging system. The back projection technique was used to reconstruct 3-dimensional surface roughness profiles from multi-directional projection data. Also, interference microscope was used for the reconstruction of surface topography for different rough surfaces.

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