QUALITATIVE ANALYSIS OF THERMAL STRESS DISTRIBUTION IN INCANDESCENT LAMP USES DIGITAL PHOTOELASTICITY METHOD

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ABSTRACT

The isochromatic fringe pattern of incandescent lamp has been analyzed to observe thermal stress distribution in photoelastogram image. Incandescent lamp has tungsten as filament which produces light when it is emitted by electricity current. The utilized models are Chiyoda lamp with 5 watt power color variation: clear, red, and blue. Polariscope used is circle polarscope set up. It is processed using digital photoelasticity by fringe image processing software. This software yields data, RGB graphic and observed intensity of pixels. Duration of incandescent lamp observation produces increasing temperature. Isochromatic fringe pattern formed is suitable with bulb color of incandescent lamp. The changing of fringe pattern shows changing of refraction index on substance gases caused by temperature. Value and intensity distribution obtained from the highest to lowest are clear bulb, red, and blue. The increasing of incandescent lamp bulb temperature is comparable with the increasing tungsten intensity level which makes the lamp brighter. Difference of RGB value influences determination of fringe level which is cause in distribution of thermal stress.

Keywords: incandescent lamp, thermal stress, digital photoelasticity