EXPERIMENTAL STUDY ABOUT IMPACT OF MICROSCOPE UTILISATION ON PHOTOELASTICITY METHODS TO IMPROVE COUNTING OF FRINGE ORDER ON THE LOADING ZONE

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Abstract

The utilization of photoelastic method in measuring strain and stress fields have been carried out. It was faced with the precision problem of determining fringe order of loading and cracking and notch areas. Several studies done to minimize it, but the same problem over and over on rapid fringe areas.

In this study, microscope was used as an additional tool in photoelastic device to get magnification of isochromatic fringe size obtained from experiment. An experimental method was used by utilizing optical system and reflective polariscope. A simple compression tool designed to provide a compression load on the solid disk-shaped specimens. Isochromatic fringe field observed at the loading zone for different loading and captured image based on such condition: without magnification, and with magnification respectively 9x, 15x and 20x by using SLR type Nikon camera Serie D3000. Image processing using OpenCV software C + + is used to produce more clear isochromatic fringe pattern formed on the surface of the specimen in determination of the maximum fringe order observed. Furthermore average of additional fringe could be obtained as the optical magnification result. The experimental analysis has been compared with Finite Elemen analysis Software.

The experimental result has shown an increasing trend in an average of additional amount of fringe-order with increasing levels of optical magnification. Its maximum value has been obtained on condition 20x optical zoom, which was 2-order fringe.

Keywords : Photoelasticity, fringe order, loading zone.