

Analysis and modeling of contact stresses between two deformable bodies

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This paper deals with a contact problem between two elastic deformable bodies. This kind of problem can be encountered in mechanical systems where contact between moving components can give rise to high stresses, particularly in the neighborhood of the contact zones. To improve design and durability one should determine accurately the type and the amplitude of the imposed stresses. Experimental as well as numerical solutions are used by various authors to tackle this kind of problem [1-3]. The analyzed model consists of a birefringent deformable disc loaded along its diameter by a birefringent deformable plan. The two stress fields developed in the neighborhood of the contact zones are analyzed experimentally with plan polarized light and circularly polarized light in order to obtain respectively the isoclinic fringe pattern and the isochromatic fringe pattern which allow the determination of the stress fields; the principal stresses directions and the values of the principal stresses differences were then easily determined. We used *castem package* to obtain numerically the photoelastic fringes in order to compare them with the experimental ones. Good agreements were achieved. Analysis of stresses along the axis of symmetry showed good agreements between the experimental values and the simulated ones.

Keywords

Stress, Contact, Isochromatic fringes, Isoclinic fringes

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