

RECENT INTERESTS IN THERMAL STRESSES

Thermal stress problems continue to attract the attention of a large international community of investigators. Based on a survey of 87 papers* published during 1996, a number of problem areas of major concern can be identified. One area of concentration, representing over one-fifth of the reviewed papers, involves thermo-mechanical behaviors of anisotropic and/or nonhomogeneous media. Among this group, 13 articles address problems associated with composite materials or structures, with 9 of this emphasizing response of laminated systems to various loads (e.g., thermal shock, combined mechanical and thermal loads, thermoelectric fields, etc.). Another area receiving considerable attention involves the potential utilization of advanced materials and "smart" structures for controlling thermal deformations; studies in this area have focused mainly on functionally graded media (6 articles) and piezoelectric ceramics (5). Thermally induced dynamic behaviors are investigated in 16 of the reviewed papers, with attention directed primarily at thermoelastic wave propagation (5), and free or forced vibrations (5) of beams, plates and shells. Other of the surveyed investigations treat: crack problems (8), including analysis of edge cracks in composite and functionally graded materials; stability problems (7) associated with thermal loading of beams, plates and shells; inelastic response (7), entailing viscoelastic, viscoplastic or elastic-plastic behaviors; development and application of numerical methods for thermal stress analysis, in particular, boundary element (4) and finite element techniques (3); thermoelastic contact problems (5); and experimental techniques (4) for determination of stress, damage or fracture, based upon thermoelastic data.

As evidence of the worldwide interest in thermal stresses, it is noted that of the nearly 50 articles published in the Journal of Thermal Stresses during 1996, the 82 contributing authors and co-authors represent 19 different countries, including: Bulgaria (2 authors), Egypt (2), France (3), Georgia (1), Germany (1), India (7), Iran (3), Italy (3), Japan (19), Korea (1), Kuwait (1), Poland (1), Romania (1), Russia (3), South Africa (1), Taiwan (7), Turkey (1), Ukraine (4), and United States (18).

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* Articles included in the survey were those appearing in Volume 19 of the Journal of Thermal Stresses plus those cited in the "Publications on Thermal Stresses" section of the journal.