Int. J. Solids Structures, 1971, Vol. 7, p. 125. Pergamon Press. Printed in Great Britain

COMMENTS ON THE PAPER: STABILITY OF A THICK RUBBER SOLID SUBJECT TO PRESSURE LOADS [1]

THE authors present results, in the case of constant directional pressure, which are qualitatively different from the results of Kerr and Tang (Refs. [1–3] of paper) for the same boundary value problem. Wu and Widera use the (incompressible) Mooney material for their analysis whereas Kerr and Tang use the (compressible) "standard" material.

The present writers were motivated by these contradictory results to investigate the effect of slight compressibility on the behaviour of rubberlike solids. A new constitutive relation for compressible materials has been introduced; this relation reduces to the Mooney relation when the material is incompressible. Studies of the boundary value problem considered by Wu and Widera, using this new constitutive relation, have been started and it has been discovered that there is an error in the paper being discussed.

Wu and Widera's work, through Section 5, is impeccable but equations (6.1) and (6.2) contain an error. These equations are given with a factor

$$\frac{8+4\lambda^2 P_2}{1+\lambda^4+\frac{1}{2}\lambda^2 P_2} \tag{1}$$

This factor should be, as a few minutes of work will show,

$$\frac{8+2\lambda^2 P_2}{1+\lambda^4+\frac{1}{2}\lambda^2 P_2} \tag{2}$$

The error in the paper is *not* typographical. We make this assertion on the basis of numerical studies of the corrected equations (6.1) and (6.2). These studies show that the effect of the constant directional pressure is indeed stabilizing but not as dramatically so as is claimed by Wu and Widera. In fact, the hydrostatic pressure has a greater stabilizing effect.

Preliminary work with the new compressible constitutive relation indicates that compressibility does not change the qualitative behaviour of the rubberlike body considered. Full details of this work are presently being prepared for publication.

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REFERENCE

[1] CHIEN-HENG WU and OTTO E. WIDERA, *Int. J. Solids Struct.* **5**, 1107–1117 (1969).