

DISCUSSION

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This is an important paper in which the concept of generalized strain measure is used for the work-hardening range. It is found that the method works for cold-worked materials of unknown prestrain as well as for fully annealed materials. The method should be successful in all irreversible phenomenon like elastic-plastic deformation, creep, relaxation, and fatigue, which are intrinsically nonlinear in character.³ It has been used for creep in bitumen with very good results. It does away with the unnecessary semiempirical assumptions of incompressibility and creep laws like that of Norton. In fact in some recent papers it has been shown that current theoretical results on creep can be obtained without making any such assumptions. The generalized strain measure combined with the asymptotic solution at the transition of the field equations give results which are very general and also contain the elastic effects.

In another recent paper by T. C. Hsu⁴ it has been shown that

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³ B. R. Seth, *Proceedings of the Eleventh International Congress of Applied Mechanics*, Munich, 1964, pp. 383-389.

⁴ *Journal of Strain Analysis*, vol. I, no. 4, 1966, pp. 331-338.

the discontinuity implied in assuming the yield condition of the type of Von Mises or Tresca does not exist, and that the use of generalized measures fully explains all experimental results.

The method deserves to be exploited in all experiments which involve irreversibility.

Authors' Closure

In answer to Dr. Seth's kind and encouraging remarks, the authors wish to say that they are applying the generalized strain concept to other problems such as the compression test, plastic bending, and the transition between elastic and inelastic behavior in metals.

A very simplified stress-strain relation was found when the generalized strain concept was applied to the transition range (where elastic and plastic strains are of similar magnitude) in the stress-strain curves of some arsenical copper samples which had been subjected to differing initial heat-treatments.

The process of linearization is rather tedious and in an endeavor to reduce this to a minimum the authors are developing a computer programme for use with a hybrid analogue-digital machine.

The results of this continuing work are encouraging and it is hoped that they will be published soon.