APPROXIMATE ANALYSIS OF STRAIN AND STRAIN CONCENTRATION

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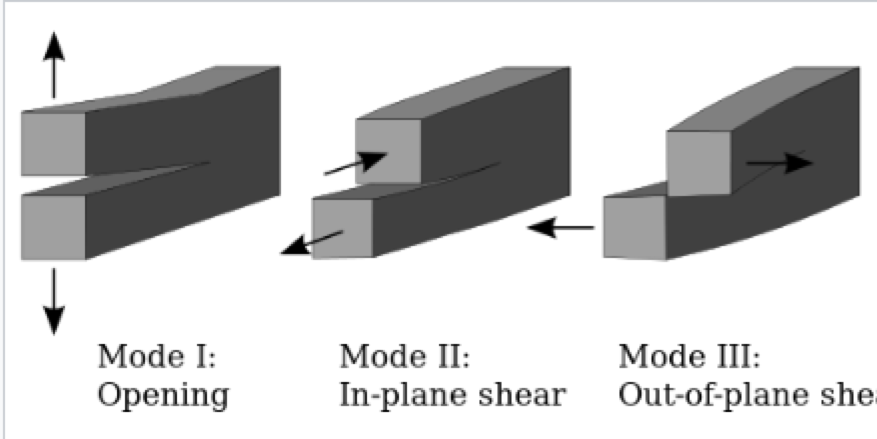
Abstract: The mechanical reaction of multiphase alloys is ruled by the microscopic strain and stress partitioning activities among micro structural constituents. However, due to restraints in the organization of the partitioning that takes place at the submicron size, microstructure optimization of such alloys is usually depend on analyzing the averaged reaction, referring to, for example, macroscopic stress and strain curves. On the other side, the fundamental may be expressed in forms of the concentrated deformation area in the vicinity of the notch tip. This implies that some information on strain concentrations is obtainable without recourse to elemental non-linear evaluations. In general, the described integrated mathematical materials engineering techniques provides a big quantity of well-correlated value and mechanical information that improve our understanding as well as the design abilities of multiphase alloys.

Keywords: **Stress, Strain, Peak Strain Analysis.**

I. INTRODUCTION

Fibre reinforced polymer (FRP) jackets have been extensively utilized in perform as a confining material for concrete columns to attain considerable improvements in both strength and ductility [1]. As the design of such jackets entails an precise stress-strain approach for the concrete they confine (FRP-confined concrete), widespread current research has been carried out on the stress-strain behavior of FRP-confined concrete, from that a amount of stress-strain models have resulted. These models come into two main forms: (i) design-oriented approaches and (ii) analysis-oriented approaches [2]. The former approaches are basically in closed-form equations straight derived from test results, treating FRP-confined concrete as a single “composite” material, and are thus easy and convenient to pertain in design. By contrast, the latter approaches treat the FRP jacket and the concrete core individually, and predict the behavior of FRP-confined concrete by an open account of the communication among the FRP jacket and the confined real core via radial displacement compatibility and equilibrium conditions [3]. Evaluation-oriented approaches are more versatile and precise in general, are often the preferred choice for use in more involved study than is required in design (e.g. nonlinear finite element analysis of concrete structures with FRP confinement), and are appropriate/simply extendible to concrete confined with materials other than FRP. They can also be used to produce numerical results for employ in the progress of a design-oriented approach [4]. Simultaneous enhancement of material strength and ductility is attainable by microstructures that join numerous deformation and strengthening mechanisms. With the exception of single-phase materials showing deformation dependent transitions among dissimilar strain-hardening mechanisms [1], in current alloy design practice joint strength and ductility optimization is typically realized by introducing different phases with contrasting mechanical characteristics. Recent examples of such systems are dual-phase (DP, [2,3]), transformation-induced plasticity (TRIP, [4,5]) steels, and ða þ bÞ-Ti-alloys [6,7], etc.



The three fracture modes

II. DEFINITIONS AND CONVENTIONS

Peak axial stress: The peak axial stress on the stress-strain curve of actively-confined concrete is the compressive strength of such concrete and the peak stress equation defines the failure surface of such concrete. The models of Mirmiran and Shahawy (1997a), Spoelstra and Monti (1999), Fam and Rizkalla (2001) and Chun and Park (2002) directly employ the "five parameter"

III. LATERAL-TO-AXIAL STRAIN RELATIONSHIP:

The lateral-to-axial strain relationship, not available in an active-confinement model, provides the essential connection between the response of the concrete core and the response of the FRP jacket, in a passive-confinement model for FRP-confined concrete. This relationship has implicitly given. Explicit lateral-to-axial strain relationships are used in the models of Mirmiran and Shahawy (1997a), Harries and Kharel (2 02) and Teng et al. (2007a). Mirmiran and Shahawy (1997a) used the tangent dilation ratio (the absolute angent slope of the lateral-to-axial strain curve of FRP-confined concrete; i.e. value of the link the lateral strain and the axial strain [7]. A fractional occupation was proposed by these authors to define the tangent dilation ratio depend on their own test results of FRP-confined concrete. Harries and Kharel(2002) instead used the secant dilation ratios (the absolute value of the secant slope of thelateral-to-axial strain curve of FRP-confined concrete which is also based on their own test results of FRP-confined concrete, to relate the axial strain to the lateralstrain [6][8]. A simplified tri-linear equation was utilized to define the variation of the secant dilation ratio. It should be defined that Harries and Kharel (2002) used different equations to predict the **LATERAL STRAINS OF CFRP-CONFINED AND GFRP-CONFINED CONCRETE RESPECTIVELY [9].**

IV. REVIEW OF FAULT SLIP INTERPRETATION

In the interpretation of individual fault slip observations, the orientations of the principal stresses sometimes are assumed to be uniquely determined by the orientations of a fault and its slip vector. In some cases, the P and T axes of a seismic focal mechanism are taken to be parallel to the maximum 6' 1 and minimum t•3 compressive stress, respectively, causing the slip event [e.g., Raleigh et al., 1972]. This is equivalent to assuming a yon Mises failure criterion for which the principal stresses are at 45 ø to the failure plane and the failure stress is independent of the confining pressure. Experimental data indicate that brittle or frictional failure is not independent of the pressure, and therefore this assumption does not seem well justified. In other cases, the principal stress orientations are inferred from the fault and slip orientations by assuming the applicability of the Coulomb fracture criterion, which includes the pressure sensitivity and is consistent with experiment. An alternative approach, however, is to interpret the direction of slip to be the direction of maximum resolved rate of shear on the fault surface. We examine these different interpretations in detail [10]. The slicken lines on a shear plane quite clearly record the relative displacement of the opposite sides along the shear plane. The two perpendicular nodal planes of a seismic focal mechanism are constructed from data that define the radiation pattern from the seismic event, which, in turn, is directly related to the displacement on the fault. Thus these data most directly provide information about the displacement, not the stress [12] [13]. Considering a deformation accommodated by shearing on a particular shear plane, the direction of shearing is the direction of maximum rate of shear on the plane. Moreover, the local strain rate that is accommodated by that shearing necessarily has principal axes oriented at +45 ø to the slip direction and lying in the plane that contains both the normal to the shear plane and [he slip,, direction [11]. Thus the local principal strain rate axes d 1 and d 3 (lengthening positive) inherently have the same orientation relative to a shear plane and its orthogonal conjugate plane as the seismic T and P axes, respectively, have relative to the nodal planes, so the two pairs of axes are equivalent. The association between the P and T axes and the local principal stress axes, however, is less obvious and less direct. Experiments show that in brittle fracture the maximum compressive stress 6'1 is oriented at less than 45 ø to the brittle fracture plane, but as McKenzie [1969] has pointed out for brittle faulting on preexisting fractures the maximum compressive stress can, in principle, lie anywhere in the quadrant that would be defined by dilatational first arrivals [14]. This same relationship would also apply to the brittle fracture of anisotropic materials. Thus the P and T axes generally do not provide an accurate measure of the orientation of the local principal stresses

V. CONCLUSION

Our purpose in this paper is to evaluate carefully the rationales behind the various hypotheses on which the interpretations of fault slip data have been based, and in particular to examine the differences between the kinematic and the stress interpretation of such data. The basis of our study is the fact that fault slip information are essentially displacement data and that the net result of several scale displacements on faults of anecdotal orientations integrated over a comprehensive scale volume is just an addition in the comprehensive continuum deformation of the degree, which is paramount defined as resulting from a cataclastic flow.

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