

# *Fracture of Circular Pipes by Internal Pressure*

T. Y. THOMAS

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**1. Introduction.** The occurrence of a small slip of the material particles or discontinuity in the particle velocity over a surface in a solid will, in general, be damped out as a consequence of the boundary conditions and the conditions imposed by the equations governing the behavior of the material. For certain special surfaces, however, the discontinuity will become indefinitely large within a finite time. These latter surfaces, called *surfaces of strong instability*, have been proposed as surfaces over which the solid will fracture or rupture. On the basis of this criterion we have shown in several previous publications<sup>1</sup> that a plate under uniform tension at the yield point may fracture along the well known Lüders band and correspondingly that a circular bar, stressed uniformly in the direction of its axis, is subject to fracture over a plane perpendicular to the axis or along a circular cone whose axis coincides with the axis of the bar.

This article<sup>2</sup> deals with the fracture of a circular pipe produced solely by

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<sup>1</sup>See T. Y. THOMAS, Plastic flow and fracture in solids, *Jour. of Math. & Mech.* **7** (1958), pp. 291-322, also Rupture of round bars by tension, *ibid.*, **8** (1959), pp. 1-25.

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