

### Acknowledgment

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## DISCUSSION

### G. O. Sankey<sup>2</sup>

The results presented in this paper are a welcome addition to the literature relative to the brittle behavior of steels.

In the spin testing of rotors taken from turbine and generator rotor forgings it is convenient to work with machined notches. The best machining techniques permit a notch root radius of about 1 mil. It then becomes necessary to speculate as to what further reduction in stress would be obtained had a notch acuity of crack proportions been employed.

The accompanying curve shows a limited number of tests that seem to support the authors' view that there is a decrease of about

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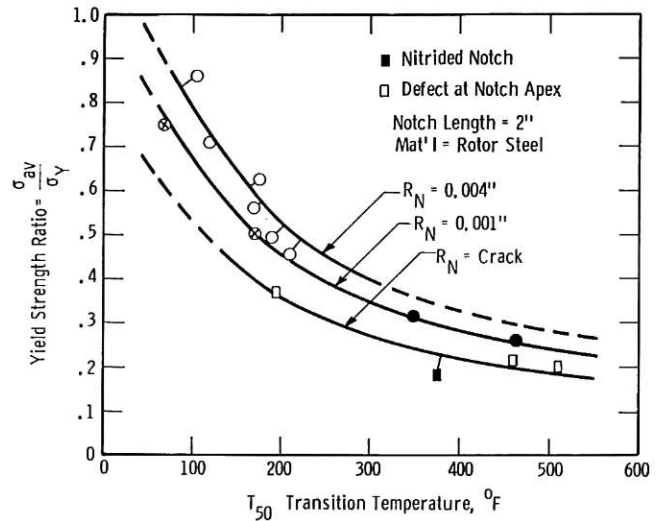


Fig. 3 Effect of notch acuity on yield strength ratio

35 per cent in fracture stress when employing a notch radius of crack proportions in preference to a machined notch root radius of 5 mils. The test points on the curve are taken from spin test results of turbine and generator rotor steels. The lower curve is a plot of fracture strength data where unusually low test values were obtained. A nitrided brittle layer was employed in one case and segregate defects were observed in the others. The segregations were located immediately adjacent to the apex of the machined notches, and it is believed that a crack forms in this weak material prior to initiation of fast fracture in the sound material.

### Authors' Closure

It is gratifying to learn that Mr. Sankey's data for a different type of fracture test confirm our results and his discussion is appreciated. In connection with Fig. 3 of the discussion, there is one consideration that should be noted. The curves as drawn indicate a lower fracture strength for crack notches relative to sharp-machined notches even in the region of low transition temperatures. It is the authors' belief that these curves will merge at some point in this region. That is, when the transition temperature becomes low compared to the test temperature, ductile fracture behavior is obtained and specimens with cracks or sharp notches will have similar strengths. There are some data in the references cited in the paper in support of this viewpoint.