DISCUSSION

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In this paper, the authors use a wear analysis to compare alternative designs for seals in a rock bit drill system. The amount of abrasive wear is predicted based upon the number of particles which reach the bearing by transgressing the seal. The approach must be commended, and one wonders why it is so seldom used in the design of component machinery. Although wear prediction is considered to be inexact, it certainly can be used as the authors have shown for comparing the differences in wear when certain variables are changed.

The authors use a wear equation with seven assigned constants K_0 to K_6. Since the referenced paper where the equation was derived is not available, would the authors tell us how these were determined – from experiments or theoretically? How do these constants vary for different materials?

Secondly, much of the results depend upon Fig. 5 which was determined experimentally. How were such experiments performed, and how well do they apply to the present configuration?

Finally, in changing from the O-ring seal to the mechanical seal, the metals and the finishes changed. Does not this account for some of the improved wear behavior?

Authors' Closure

The authors would like to thank Dr. M. B. Peterson for his comments and contribution in his discussion. The derivation of the wear equation developed by the authors and the determination of the seven constants in the equation are given in a paper entitled "An analysis of the Influence of Plastic Indentation on Three Body Abrasive Wear of Metals," which the authors will present at the International Conference on Wear of Materials in Houston, April 5–9, 1987. The experimental results shown in Fig. 5 were obtained on the wear test machine made by Shanghai No. 1 Petroleum Machinery Works, and they apply only to the present configuration. In changing from the O-ring seal to the mechanical seal, the main cause of failure of seal changes from abrasive wear to adhesive wear, of course the metals and finishes play an important part.