

## **Sliding-Rolling Contact Fatigue of Rough Surfaces**

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### Abstract

Most heavy-duty and critical machine components operate in contact modes ranging from mixed lubrication to dry. Consequently, surface fatigue arising from asperity interaction becomes an important and often predominant failure mode. The present study seeks to develop a synthetic approach to the numerical simulation of surface fatigue. First, the contact problem is solved using a recently developed mixed lubrication solver, which is capable of dealing with the full range of contact modes of interest. Then the stresses in the near-surface region are calculated using fast numerical techniques of FFT and MLMS. Finally, the fatigue life is estimated using a statistical. In addition, reduction of the fatigue life in sliding-rolling contacts due to increased asperity stress cycles is considered, using idealized surfaces as an example.

### Biographical Information

Leon. Keer has been a member of the Northwestern University (Evanston, Ill.) faculty since 1964 and is currently Walter P. Murphy professor of mechanical and civil engineering. Through his research, which was primarily concerned with the development of innovative analytical techniques, Keer has made fundamental contributions in the design of gears, bearings and railway rails, and in the areas of biomechanics and geophysics. His work involved developing solutions to engineering problems associated with large stress gradients and concentrations. He has published numerous articles in professional journals on engineering and applied mechanics. Recently, he was elected to the National Academy of Engineering and was awarded the ASME Drucker Medal.