Methods and devices used to measure friction in rolling

Friction at the workpiece-die boundary, in both bulk forming and sheet forming is, arguably, the single most important physical parameter influencing the processing of metals; yet it remains the least understood. Hence there is a need for basic research into metal-die interface mechanisms. To gain a good understanding of the mechanisms at the interface and to be able to verify the friction and tribology models that exist, friction sensors are needed. Designing sensors to measure frictional stress in metal working has been pursued by many researchers. This paper surveys methods that have been used to measure friction in rolling in the past and discusses some of the recent sensor designs that can now be used to measure friction both in production situations and for research purposes.