

Get the most out of condition monitoring data: Improving conveyor belt wear forecasts to make better maintenance decisions



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A reliable conveying system is critical to the productivity of an iron ore mine. If a conveyor in the system fails unexpectedly during a planned period of operation, production in that part of the mine stops. Therefore, engineers collect condition monitoring data to decide when the component should be preventatively replaced before its degraded state causes unplanned downtime and loss of production.

One critical component is the conveyor belt. Reliability engineers take ultrasonic thickness (UT) measurements at multiple locations across the width of the belt surface to monitor the wear of the protective rubber topcoat and manage the risk of the structural part of the belt being damaged by the ore. Engineers try to predict when the wear will exceed an unacceptable threshold, beyond which the protective topcoat no longer provides sufficient protection for the structural part of the belt to plan when the belt should be replaced. However, methods typically used in practice to forecast the wear of the topcoat and hence predict the remaining useful life of the belt neglect the rich structure of the data and do not include any uncertainty quantification.

Ryan presented new method for modelling belt wear in this presentation. He will demonstrate how to forecast the evolution of the wear profile through time to get a predictive distribution of the wear at a particular time horizon. Ryan demonstrated how the predictive distribution can be used to derive remaining useful life and inform maintenance decisions.