ABSTRACT OF PAPER

Title of Paper *(limited to 15 words in CAPITALS):*
MANAGING THE TRANSITION FROM RAIL WEAR TO ROLLING CONTACT FATIGUE IN A HEAVY HAUL ENVIRONMENT

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Abstract *(max 350 words)*:

The transition from wear to rolling contact fatigue as the dominant rail deterioration mode presents a number of significant challenges in a heavy haul environment, due to the inherently higher risks of rail failure and service interruption. Managing these risks requires a strategy that involves correct identification and measurement of the extent of RCF damage, and the development of preventative actions which may include use of alternative rail grades, improved rail grinding procedures, or in some cases implementation of a friction management approach for the rail-wheel interface. The ease of implementation and cost-effectiveness of each of these actions may vary between individual systems.

In the heavy haul operations at Rio Tinto Iron Ore, rolling contact fatigue damage in rails first became apparent in the early 1990's, and was associated with the introduction of modified (wear-adapted) wheel and rail profiles, and the increasing use of higher strength materials. However expansion of the network to meet the increasing demands for iron ore in the global market presented a number of new challenges associated with the optimum use of rail material grades in different track sections, the capacity to adequately maintain the rail by grinding, and the impact of rolling contact fatigue on allowable rail wear limits.

The experience in managing these challenges within the Rio Tinto heavy haul network has demonstrated that it is possible to address the risks associated with RCF damage in rail using a combination of operational experience coupled with research which is aimed at quantifying some of the “unknowns” associated with the influence of loading conditions, rail head loss, and rail material grades and directing this knowledge to improved rail management procedures.

The demands of ever-increasing haulage rates, in conjunction with further developments in high strength rail steels, are likely to present future opportunities to lessen the impact of RCF damage. For this reason, further research into the rolling contact fatigue behaviour of these newer steel grades, combined with the development of improved rail welding procedures, are considered necessary.