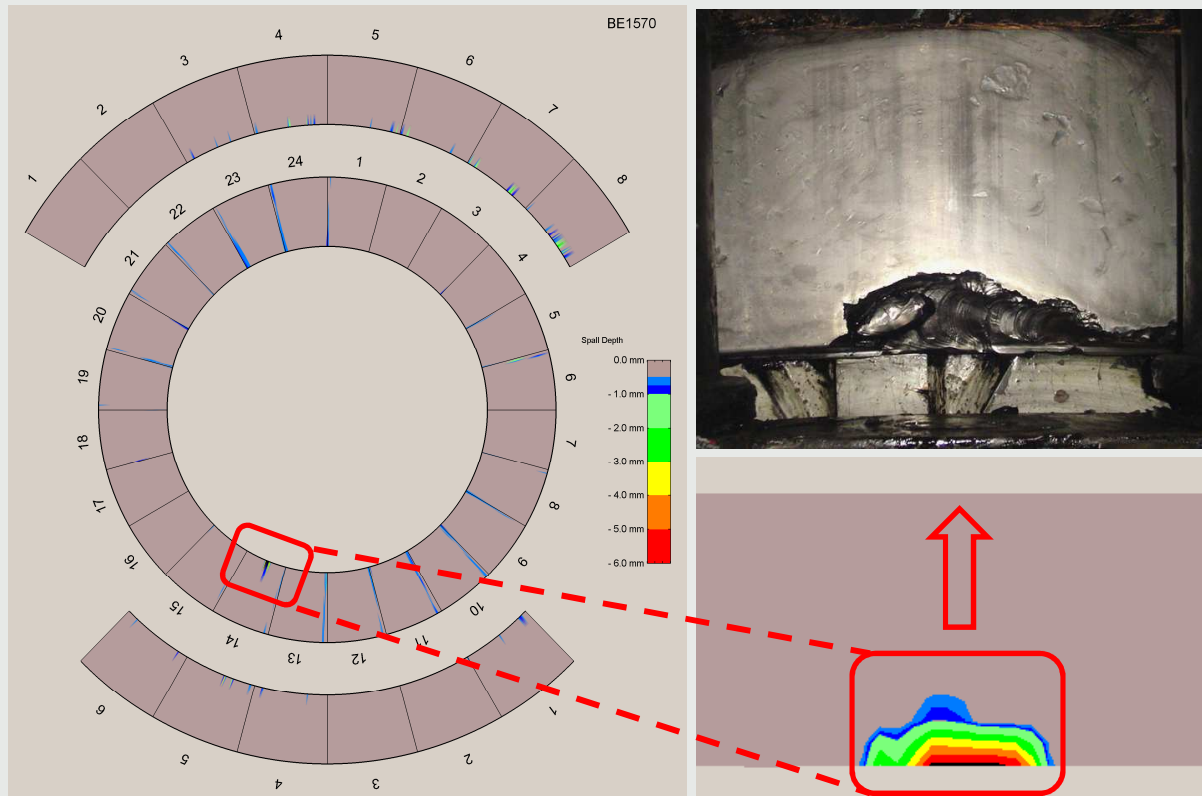


# Spall Testing - Inspection of Dragline and Shovel Roller Circles

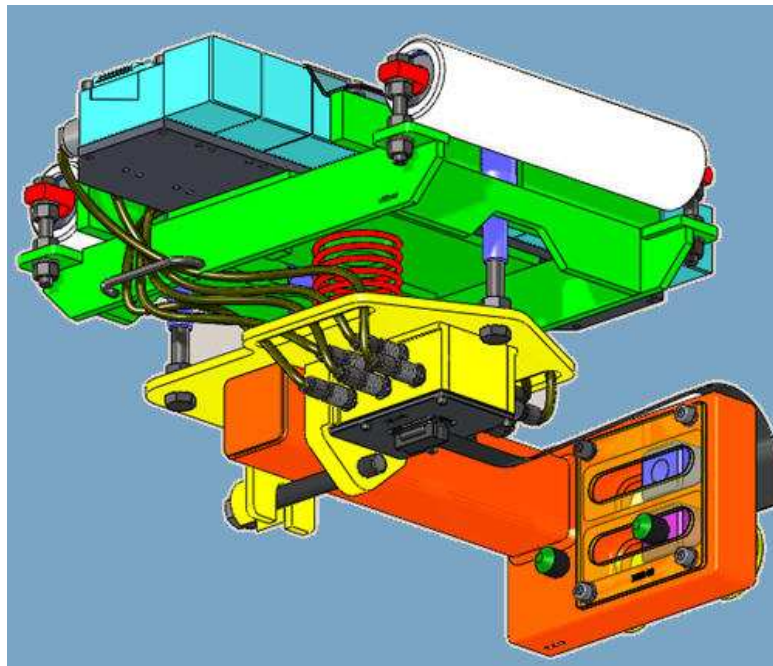


## The Problem

The major mechanism of deterioration of the roller circles on draglines and mining shovels is through spalling. During normal operation, sub-surface cracks form in the rails and rollers usually at areas of high loads. A spall is formed when these cracks reach the surface of the rail or roller and a piece of the working surface breaks loose. Over time more cracks are formed and the 'spall' grows. The severity and the rate of spalling determines the risk to operations and the need and the timing for roller circle replacement.

## The Solution

By monitoring the condition of the rails, it is possible to establish the degree of risk due to spalling and manage the end-of-service-life for considerable time before replacement is necessary. The BMT WBM spall detection system provides an efficient, accurate and fast condition assessment of the surface of the rails. It determines and presents graphically, the extent, depth and distribution of the spalls across the rails. The spall detector is fitted into the space created by the removal of a single roller from the circle and the upper and the lower rails are scanned while the machine is slewed. The whole test can be completed in approximately 3 hours.



### Why Monitor Spalled Rails?

When operating with a spalled roller circle, there is always the risk that a roller will mistrack or, that a piece of rail will come loose and become jammed somewhere in the roller path with potentially catastrophic consequences. Spalling can also result in increased loads which cause higher stresses and cracking in the tub and revolving frame structures.

Roller circle components are frequently replaced prematurely, or occasionally too late. Although draglines and shovels can be operated for a considerable length of time with spalled rails and rollers, the risk of damage to the tub and revolving frame also needs to be considered.

Objective risk analysis, based on actual rail surface condition and historical spall data, can ensure an accurate assessment of the rail condition, resulting in obtaining longer life from the rails or avoiding catastrophic failure.

Regular monitoring of rail spalls provides the maintenance or planning personnel with the information necessary to make the decision when to replace rails or how long to continue to operate.

### The BMT WBM Spall Detector

The entire width of the rail is scanned simultaneously, using inductive proximity transducers which measure the distance to the steel. In this method the probes only detect where the material is actually missing from the surface, providing an accurate assessment of the load bearing surface of the rails.

Since the transducers are non-contacting and there is an air gap between the probes and the rail, it is unnecessary to remove rail lubricant or to apply coupling fluid.

### Key Benefits

Detects and graphically presents the extent of spalling in an easy to use format.

Monitors the rate at which the spalling propagates by comparing the results from previous tests.

Badly spalled rails can be easily identified assessed for the level of damaged and replaced if required on a scheduled basis to limit risk and avoid downtime.

At only 3 hours duration, the test can be performed in a range of circumstances to avoid disrupting production.

Compatible with all Bucyrus, Marion and P&H draglines in operation.