PearlStreet

MINERALS PROCESSING CASE STUDY

DETECTING LOCALISED SLURRY PIPELINE WEAR DUE TO INTERNAL SCALE BUILD-UP

SERVICES: Condition Monitoring, NDT

THE PROBLEM

Alumina refineries often suffer from internal scale build-up occurring in slurry pipelines. The consequences of this scale build-up can result in the following scenarios:

- Machinery damage
- Product flow restrictions and or blockages
- Localised pipe wear which can lead to pipe wall perforation ('hole-out')
- Product flow turbulence resulting in uneven wear patterns

All of the above can lead to production losses, increased maintenance costs, environmental hazards due to leaking product and ultimately profit losses.

THE CHALLENGE

To accurately detect internal scale build-up so that it can be effectively addressed, thus minimising its consequences on plant performance.

THE SOLUTION

Thermography in conjunction with ultrasonic thickness testing is used to detect loss of wall thickness in pipelines, thereby enabling efficient maintenance strategies to be implemented thus minimising conditions such as those listed above.

Detecting internal scale build-up within pipelines using thermography is based on the concept that any internal scale build-up will thermally insulate the pipeline's exterior surface from the higher product temperature. Thus, a pipeline containing internal scale build-up is likely to display a surface temperature differential (a thermal bloom) at the scale built up area.

The technique involves firstly performing a thermographic survey on susceptible pipelines, identifying all the localised scale deposits (see Figure 1 below).

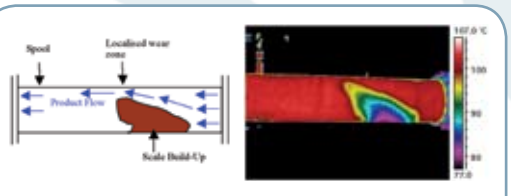

Figure 1: Diagram and corresponding thermographic image of a slurry pipeline spool containing a localised scale deposit. The thermal anomaly within the above thermographic image is a lump of localised internal scale build-up.

Once the localised scale deposits have been identified a thickness survey is conducted around the scale built up area to determine the areas of pipe thinning.

The above case study revealed a localised area of pipe thinning the size of a 20 cent piece. This localised area of wear represented wall thickness loss of approximately 25% when compared to the rest of the pipe spool thickness.

THE BENEFITS

- Detection of pipeline wear without disrupting plant operations
- Identification of localised pipe thinness to allow for targeted replacement