

## THE SCREEN MOTION ANALYSER – FROM CONCEPT TO COMMERCIAL REALITY

The development and commercialisation of a lightweight, portable screen motion analyser is expected to save the Australian coal industry millions of dollars a year in lost production and preparation plant maintenance costs.

The concept of the screen motion analyser (SMA) was initiated more than a decade ago by CSIRO Energy Technology as part of an ACARP project to improve preparation plant vibrating screen performance. A team led by Project Leader Mike O'Brien produced a prototype, which was then developed into a commercial product by major screen manufacturer and service provider, Ludowici, and others.

The SMA checks that vibrating screens are operating correctly. In particular, it assesses vibrating stroke and operating frequency, which are necessary to ensure screen performance and efficiency are optimised.

The SMA is user-friendly, does not require specialist training to operate, and can be used safely without impacting production. It is fixed to the screen using magnets, records vibration simultaneously in three directions (horizontal, vertical and lateral), and sends vibration data to a Smartphone via Blue Tooth. The unit calculates and displays screen operating frequency, vibrating stroke and lateral displacement (pk-pk), and can save files for further analysis.

Mike O'Brien said previous methods of measuring strokes and driven frequency – stroke cards and stroke gauges – were not reliable.

"The stroke of the screen is important as it relates to the screen's capacity to move material from the inlet end to the discharge end. If this movement is not linear, it can cause hold up issues and material surging," he said.

"Uneven distribution of the feed onto the screen deck can cause a deviation in the motion across the screen, leading to higher screen wear. If the frequency of the screen drifts is too close to the natural screen frequency, then catastrophic failure can occur."

Repairing screens is a time-consuming process which impacts on coal production and, at up to \$500,000 each, replacing screens can also be expensive.

Ludowici General Manager Engineering Rob Angus believes the SMA will become a useful tool for the coal industry.

"It will give the mines the ability to check the operation of their screens and feeders more regularly, thereby improving machine operation as well as reducing the risk of damage due to incorrect operation," he said.

"We are getting a lot of interest and very positive feedback from the industry. We wanted the device to be user-friendly and not require great levels of expertise to operate. The feedback we have received confirms that we have achieved this."

Manager of Coal Preparation for Xstrata Coal, Frank Mercuri, said the availability of a robust and simple tool that could readily measure and record vibrating equipment motion would greatly assist in identifying issues and potential for excessive or unbalanced structural loadings.

"The tool will aid in the identification and rectification of inadequate screen material loading which will not only optimise screen life but will optimise screen metallurgical performance and that of subsequent downstream unit processes in the CHPP," he said.

Mike said in his original research he was required to quantitatively measure the stroke and frequency of the screen.

"In order to do this I used a tri-axial accelerometer connected via a DA board to a laptop. I wrote some software to measure, record and display the data from the accelerometer in 3-D, which required filtering and integration of the signals," he said.

"One day while I was recording this information, a screen supplier visited me. He saw the output and commented that he would love a portable version. So I successfully applied for ACARP funding to develop a portable device that wirelessly connects to a portable sensor and can be attached to the screen."

This concept was further developed, commercialised and is now available for purchase from Ludowici.

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