



# IPACS

Dedication & Innovation



# THIESS

## PLANETARY GEARBOX MONITORING PROJECT

**Assessing the viability of an onboard remote monitoring system for Caterpillar 793D dump trucks at the Prominent Hill mine site for advanced fleet management and real time condition assessment.**

# THIESS

## PLANETARY GEARBOX MONITORING PROJECT

### Purpose of the Test Program:

Thiess operate 32 Caterpillar 793D dump trucks at the Prominent Hill mine site. Currently, Thiess overhaul 793D planetary gearboxes every 20,000 hours, as per OEM recommendations. The cost of each rebuild is \$180,000. The total re-build budget is \$12.25M dollars. Thiess intend to extend the overhaul of the gearboxes by 25% to 25,000 hours. Targeted savings from this project are \$1.8M per year per mine site for Thiess.

IPACS remote data communication technology in association with a fixed installation vibration technology allows for the early identification of machine faults through the analysis of machine vibration signature.

The purpose of this project is to monitor the performance of the planetary gearbox using the integrated IPACS technology to enable Thiess to extend the life of the planetary gearbox. As part of the test program we will report to Thiess

- a) The ability to retrofit the truck with vibration and speed sensors
- b) The ability to monitor the performance of the planetary gearboxes

### CavPower visit:

IPACS engineers and Thiess lead plant engineer visited Cavpower facility in Adelaide. During the visit IPACS engineers had the opportunity to examine the interior of the planetary gearbox.

After a thorough inspection it was identified that by placing sensors on the inner hub and the locations identified below it would be possible to measure the vibration signatures of the planetary gearbox. This is because there is a direct vibration path between the planet gears, ring gear and the sensor installation points.

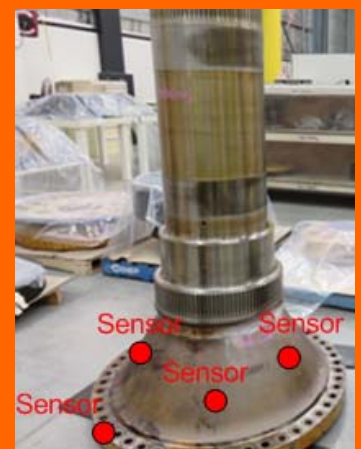
## REMOTE DATA COLLECTION

An integrated vibration monitoring and 3G modem system was installed on the truck.

The integrated system collects and temporarily stores the data.

The 3G modem attempts to establish a connection.

Once the connection is established data is transmitted from site to the Remote Asset Management Centre in Adelaide via a virtual private network.



Sensor Installation Positions

## Installation:

Technology was installed out between 23rd July and 25th July. Installation was carried out by Vinay Sriram (IPACS) and Jim Demou (Thiess Electrician).

A total of 11 sensors were installed at the following locations.

- LHS Differential Horizontal
- LHS Differential Vertical
- LHS Differential Axial
- POS3 planetary gearbox Horizontal
- POS3 planetary gearbox Vertical
- POS3 planetary gearbox Axial
- POS3 inner hub
- RHS Differential Horizontal
- RHS Differential Vertical
- RHS Differential Axial
- POS4 inner hub



Sensors installed on the LHS and RHS of the differential



Sensor installed on the POS3 wheel hub



Sensor installed on the POS4 inner hub box inside the driver cabin

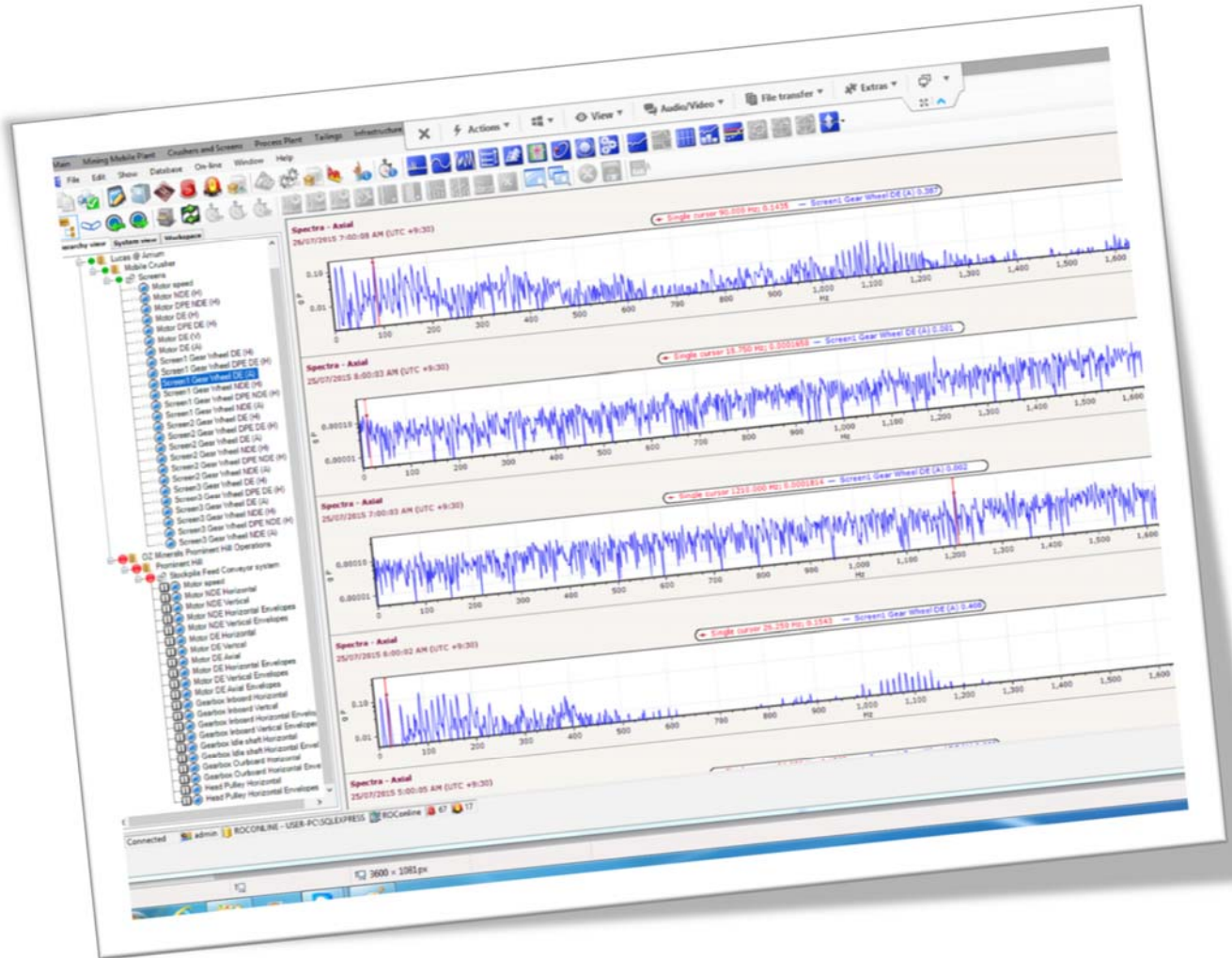


Installation of the IPACS remote monitoring box inside the driver cabin

## Online monitoring:

Vinay Sriram demonstrated the remote technology to Thiess staff at Prominent Hill.  
(see screen shot below).

Thiess engineers will now collect data every 30 minutes to study the data in greater detail.



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