CASE STUDY

Application Background

<table>
<thead>
<tr>
<th>Commodity:</th>
<th>Iron Ore/Overburden</th>
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<tbody>
<tr>
<td>Digging Conditions:</td>
<td>Hard/Moderate</td>
</tr>
<tr>
<td>Machine:</td>
<td>Backhoe</td>
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<tr>
<td>Make &amp; Model:</td>
<td>Liebherr 996, 996B, R9400</td>
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<tr>
<td>Customer/Site:</td>
<td>Pilbara, Western Australia</td>
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<tr>
<td>Installation Date:</td>
<td>2018-2019</td>
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Challenges

This study focuses on an Australian tier one miner based in the Pilbara operating a fleet of backhoe excavators and autonomous trucks in iron ore and waste materials. Maximizing truck payload across the fleet was high priority to the production management team. Although the miner was running the latest fleet management systems, the number of truck overloads recorded daily was identified as a bottleneck to production. Excavator operators did not have the confidence to target high capacity loads using weights reported by truck payload systems due to variable accuracy and latency. The challenge was to provide an accurate real-time truck payload tool so that operators could increase average truck payloads and maximize productivity without increasing overloads.

The Solution

CR Digital’s experienced field technicians worked with the Miner to install the Titan 3330™ Load Haul Optimization system on the fleet of Liebherr backhoes. Titan 3330 is specifically designed to enable accurate truck loading, while minimizing truck overloads by providing real-time, pass-by-pass feedback to operators. Sensors fitted on the excavator identify individual bucket cycle and truck payloads. A running summary of each truck and bucket payload is reported live on the Titan 3330™ user interface.

Operator training on the intuitive Titan 3330™ system was rolled out once the product was installed and commissioned. Data reporting tools were provided to the customer to observe the impact of the system.
CASE STUDY (Continued)

The Impact

The CR Digital Titan 3330™ Load Haul Optimization system delivered:

- 3 tonne increase to average truck payload
- 1% decrease in overloaded/derated trucks
- 245,000 additional tonnes moved per machine per year

With Titan 3330™ - operators were able to increase average truck payload while decreasing truck overloads – maximizing productivity.

Truck Payload

Increasing median truck payload while maintaining or decreasing overload rates can dramatically increase the overall productivity of an excavator.

Titan 3330™ Load Haul Optimization and Analysis and Improvement capability can improve your fleet’s performance today.
Titan 3330™ Load Haul Optimization Analysis and Improvement capability can improve your fleet’s performance today.

Truck Payload Classification per Period  
(10 excavators and Titan 3330 systems included in sample)

**Before Titan**
- Underloaded: 35%
- Loaded to Target: 59.7%
- Overloaded: 5.3%

**After Titan**
- Underloaded: 25.6%
- Loaded to Target: 70.1%
- Overloaded: 4.3%

*Tramming & idle time not included

**Additional Benefits:**
- 9.4% Reduction of truck underloads
- 1.6% Increase in Instantaneous Productivity*
- 1.4% Increase in truck fill factor (compared to truck rated capacity)
- 1.7% Decrease in truck payload Spread
- 10% Reduction in machine attachment duty

**Instant. Production Rate**
- Before TITAN: 6,688 tph
- After TITAN: 6,808 tph

**Average Truck Payload**
- Before TITAN: 230 t
- After TITAN: 233 t

(10 excavators and Titan 3330 systems included in sample)