LIEBHERR

Award winners Q&A: Liebherr's Trolley Guidance & Crusher Guidance Systems (TCGS)

Q: What is the background story to the TCGS?
The TCGS solution spawned from a customer suggestion regarding a steering guidance system for Liebherr haul trucks. They experienced multiple incidents induced by operator error that cost the company in both production downtime and extensive repair costs.

Incidents of this nature are not isolated to a single site, however, as similar occurrences have impacted operations throughout the industry. Some examples include: accidental/unintended haul truck contact with crusher infrastructure, and truck/trolley line damage from premature pantograph extension or delayed retraction.

With the customer's best interest in mind, Liebherr initiated an extensive development effort to assist in mitigation of these safety incidents.

Q: How can the TCGS improve operations?
The TCG system improves safety by reducing the overall stress of the operators conducting these and focus-filled tasks by "off-loading" them onto an intelligent controller. This allows the operator to concentrate on their surroundings and manage site operation functions more effectively and with fewer errors. A few of the cost reduction benefits realized by the mine include decreased operating costs through consistent and reliable on-trolley power usage, truck maintenance costs through extended replacement intervals of pantograph wear items, and site maintenance costs involved in road resurfacing resulting from an integrated dynamic path adjustment feature.

Q: What are the key features of the TCGS?
The Crusher Guidance System provides automatic steering and stopping assistance while backing into a fixed structure. It has the capability to manage multiple crushers and provides a configurable maximum speed control. This contributes to faster cycle times and reduces the risk of damage to the machine, tyres, and site infrastructure. The Trolley Guidance System automatically steers the truck to follow a consistent travel path while traversing the trolley power lines and provides automatic pantograph extension and retraction control at optimized locations. It reduces mental and physical stress on the operator while enabling maximum utilization of the site's trolley infrastructure.

Q: How does TCGS aid in ESG objectives?
The guidance systems help operators reach their environmental objectives by improving the efficiency and effectiveness of a haul cycle.
The Trolley Guidance System can improve utilization of the trolley infrastructure through consistent and increased trolley engagement times, resulting in decreased fuel consumption and a reduction in CO_2 emissions. Environmental benefits resulting from the Crusher Guidance System can be realized through a reduction in crusher backing cycle time by mitigating truck-to-crusher realignment and repositioning efforts, potentially reducing waiting and unnecessary idle times for other queued trucks at a crusher area.

Award winners Q&A: The Liebherr R 9600

Q What design strategy was taken to enable the Liebherr R 9600 to achieve its class-leading productivity?
We focussed on a customer-centric design, including key equipment users into the R 9600 definition and development phases. This resulted in a machine that provides a superior level of safety, operator ergonomics, productivity, maintainability and reliability. The R 9600 also incorporates technology products, connectivity solutions, and enables interoperability, making it future-proofed for future automation products and zero emission solutions.

Another strategy we implemented during the R 9600's design was to minimise hydraulic losses and maximise efficient utilisation of available drive line power. This minimises the power demand of cooling systems and maximises the available power to the working functions of the machine.
The benefits of this, in combination with effective break out and digging forces, and Liebherr Power Efficiency products, results in class-leading productivity of the R 9600.

Q How was Liebherr able to achieve an increased overall production rate in the R 9600?
Liebherr not only succeeded in establishing market-leading productivity in the R 9600, but has increased the overall machine life through component design improvements. This optimisation of the component design, achieved through close consultation with our component suppliers and partners, has resulted in an improvement in major component lifecycle and performance.

This component optimisation has also led to a strategic maintenance strategy which includes all major components of the machine, whether they are structural, electrical, or mechanical.

Q: What power transmission innovations can we see in the R 9600?
Liebherr has developed two innovative fuel saving solutions: Liebherr Power Efficiency Engine Control and the Liebherr Power Efficiency Hydraulic Control. Both products are serially embedded into the machine control systems of the R 9600 and do not require any specific operator training to realise the benefits.

This has resulted in the R 9600 providing an overall 20% fuel consumption reduction compared to the previous R 996B model, without compromising the net productivity. The same Liebherr Power Efficiency features have also been developed to reduce the electrical power demand in the electric-drive R 9600 E.

Q: Can you explain some of the new features and design advantages in the new Liebherr R 9600?
The R 9600 is introduced as a "Generation 8" machine, incorporating our latest electronic architecture, "Liebherr Mining Litronic". This electronics platform enables edge computing capability through which several Assistance Systems are realised. These Assistance Systems support equipment users with analytics and actionable insights, and mine management with KPIs and reports.

In combination with the edge computing, our Cloud and Digital Services will offer enhanced features and equipment benchmarking.