CrusherLensIQ

Accurate & reliable gap measurement that improves safety and operations on-site

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Presentation overview

Crushing 101

Primary crushing is the first stage in the comminution process, and its main purpose is to reduce the material to a small enough size that it can be transported to the next crushing stage.

The Gyratory crusher has 2 main parts which crush the material.

1. **Main-shaft** which oscillates in the centre and the **Concaves** which line the shell.
2. The crusher is equipped with a hydraulic piston so that the main-shaft can be adjusted as the liners wear.
3. The main-shaft is adjusted to maintain the CSS.
4. Maintaining the CSS is critical for the product size exiting the crusher.

Key challenges in crushing for miners using traditional gap measurement methods

Gap measurement harbors many risks

Manual gap measurement requires workers often to enter hazardous areas near the crusher.

To ensure safety, production usually must be stopped for conventional gap measurement, which requires unplanned downtime.

Inconsistent & inaccurate gap measurement

Obtaining precise gap measurements is difficult due to crusher size, wear, and uneven gaps.

Inaccurate measurements and improper gap adjustment can reduce crusher performance and affect product size and quality.

Availability & productivity is impacted

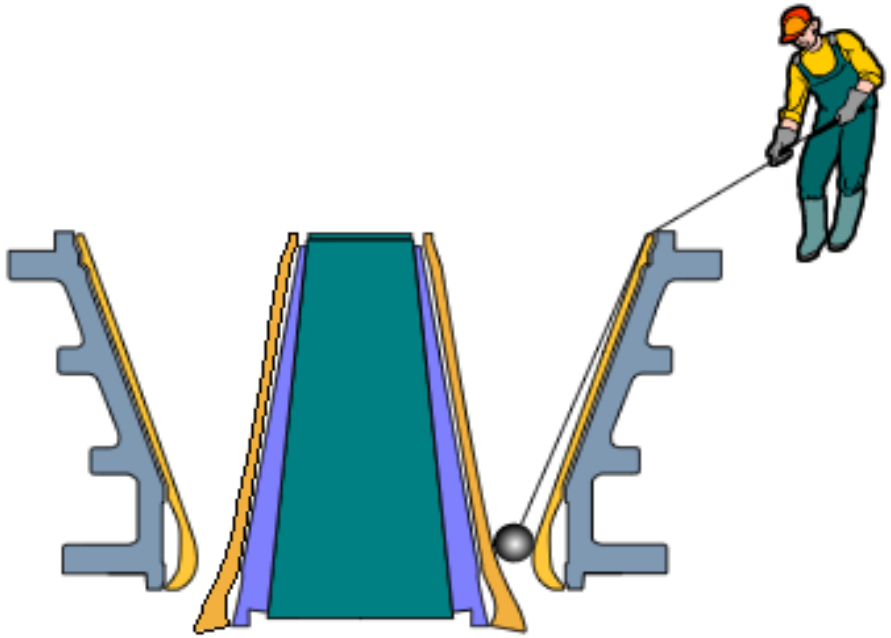
Gap measurement frequently requires production stoppage, causing delays and downtimes.

Downtime results in significant financial losses due to reduced productivity.

Evolution of CSS Measurements

Historical Methods

- Manual measurement with Foil Ball / Lead Weight or Pressure Ball
- Measurement during crusher shutdown - taken physically
- These methods are outdated with the digital boom in the mining industry



CrusherLensIQ for Gyratory Crushers

Measure, Analyse, Optimise - Safely

By implementing the field-proven FLS remote-operated CrusherLensIQ system, gain insights with a safer, repeatable and more accurate method for data-driven decision making to optimise your crusher operation - whenever you want.

Performance

Enable improved crusher performance and reduced downtime with easily repeatable measurements of the OSS gap at a higher frequency than conventional methods.

Safety

Control the device and gap measurement remotely, which removes employees from dangerous and risky situations.

Introducing the CrusherLensIQ

Remote-controlled measurement

Dust-resistant camera

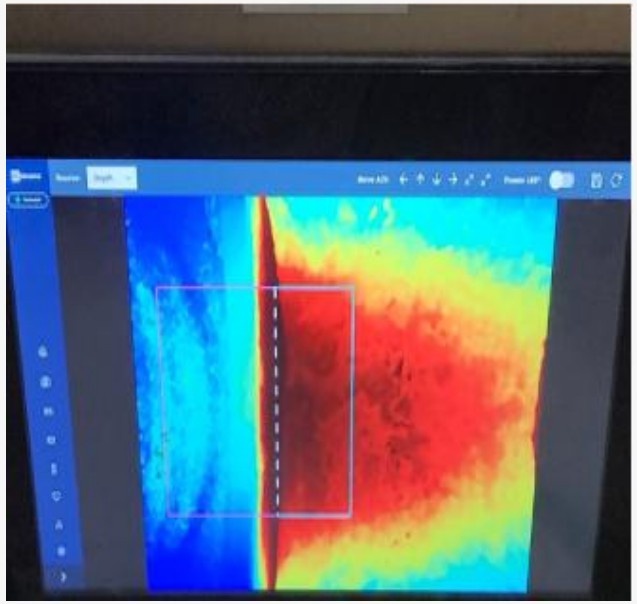
Larger measuring range

Measurement during empty crusher operation

Complete CrusherLensIQ system

Crusher Workplace

Camera remote control from control system

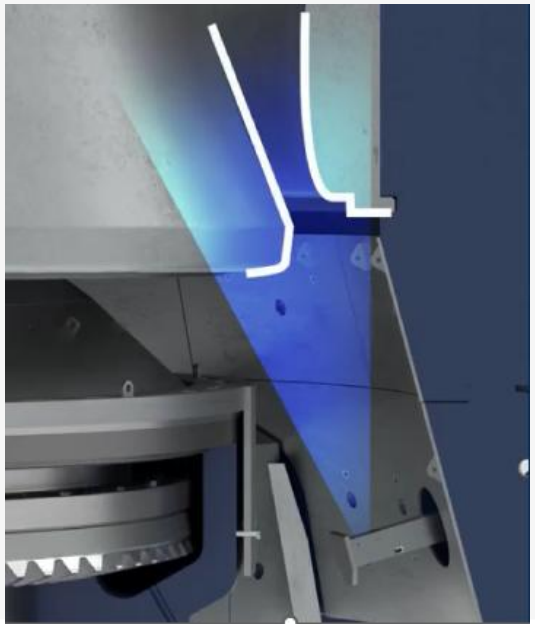


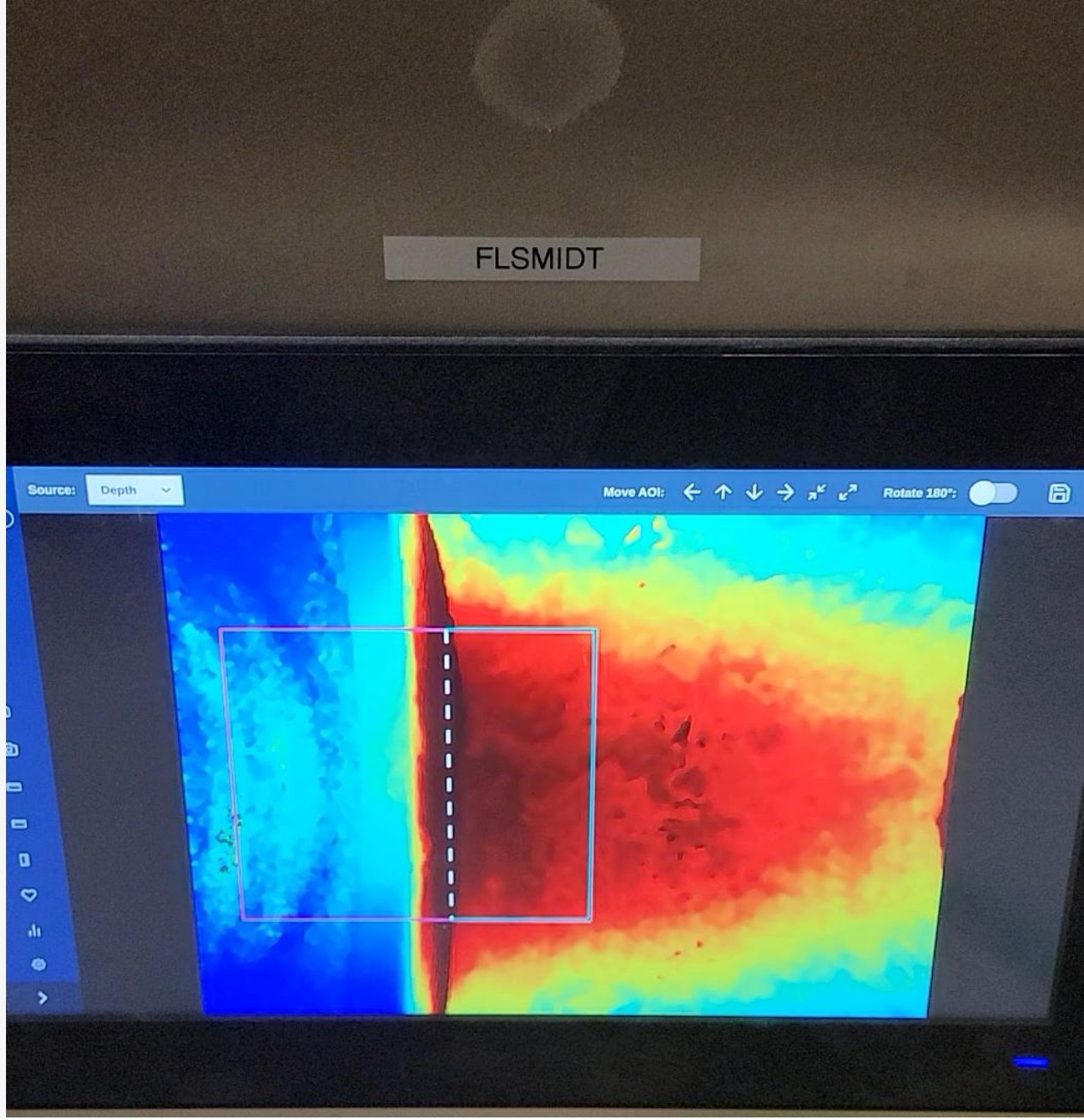
Camera system result calculation

Computer vision – evaluation / AI = machine learning

Key features - Camera

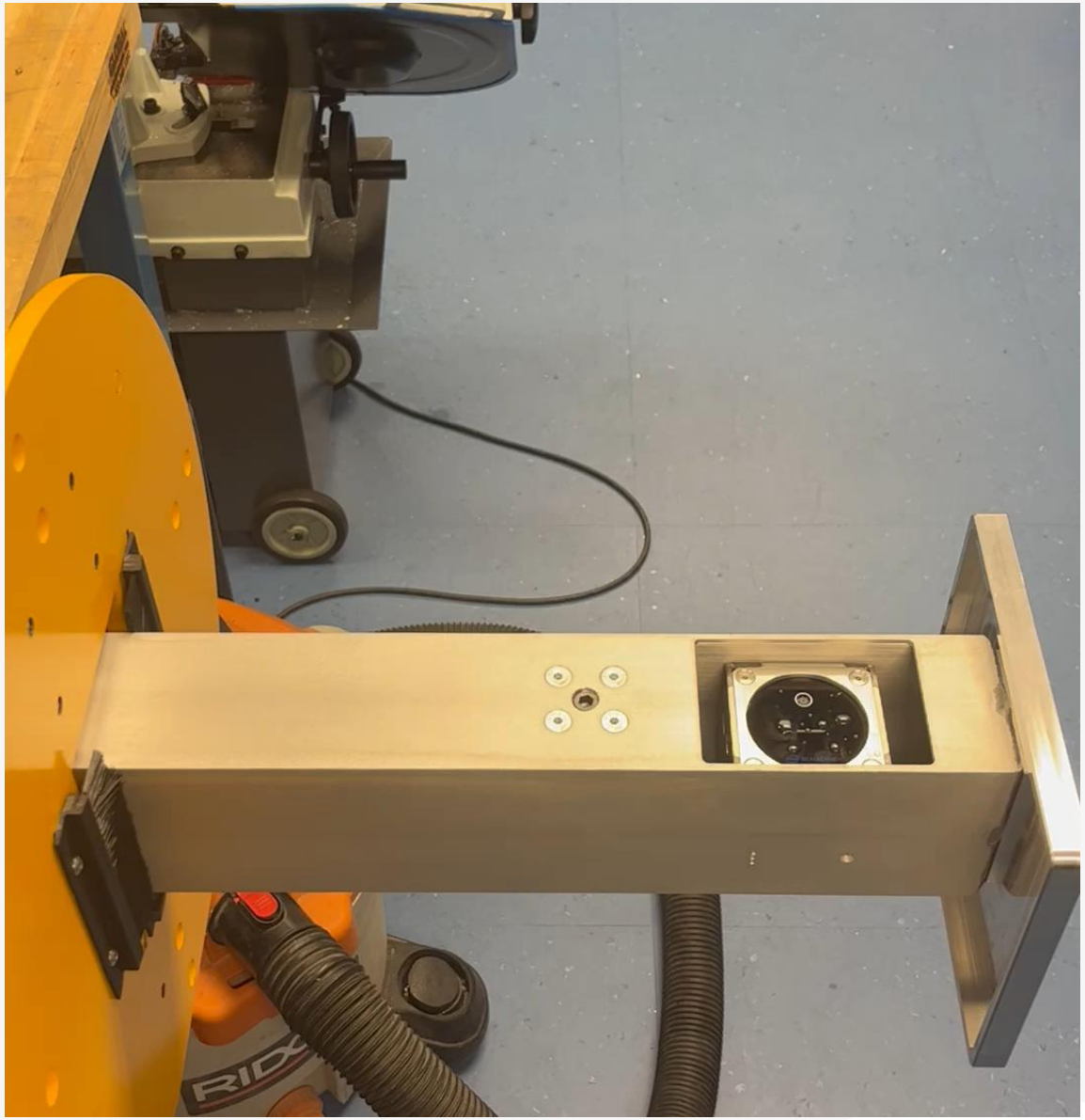
- **High accuracy : Depth sense camera**
- Time-of-Flight (ToF): Emits a light signal (usually infrared) and measures the time it takes to return after hitting an object, directly correlating to distance.
- **Range : 0.3m to 8.3m**
- **IP67 Protected**





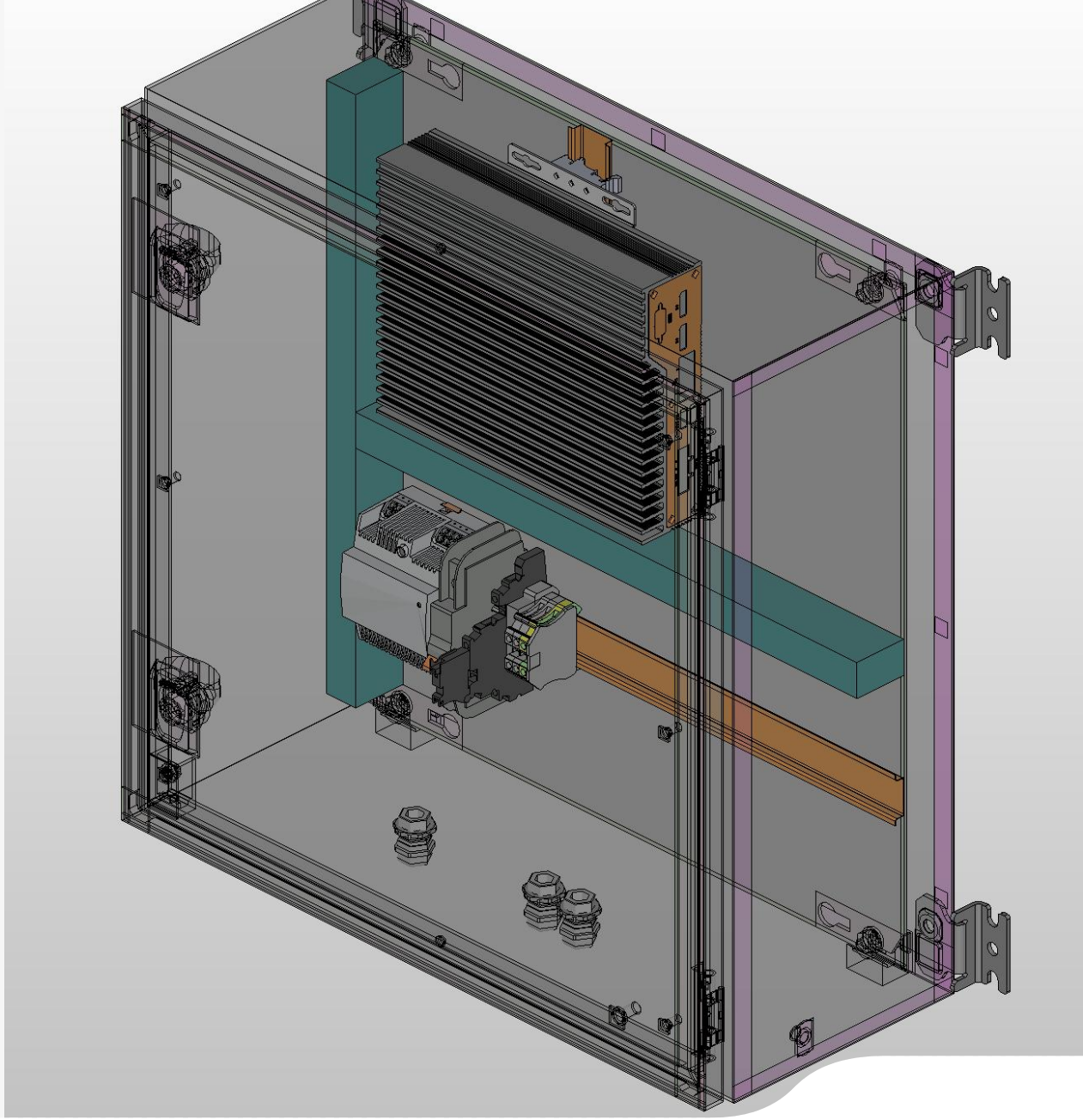
Key features - Actuator

- **Ease of installation:** No additional design features or changes are required for the crusher as the camera uses the existing inspection ports
- **Air actuated Cylinder :** 2 x Limit switches control the extension and retraction of the camera
- **Compressed air storage tank :** This is used to manually retract the cylinder if plant air is lost
- **Air Knife Cleaner :** This is an air cleaner that sits over the camera and operates when the camera is extended or retracted to clean any dust from the surface of the camera



Key features – Control Panel

- **Robust design:** Stainless steel box with an IP66 rating
- **Network Interface:** Ethernet
- **Power Requirements:** 240V
- **CPU:** OnLogic Helix edge computer
- **Software:** FLS sense platform



How it works – Initial Calibration

Phase 1 – Initial data collection

Phase 2 – Offline model tuning

Phase 3 – Validation and final calibration

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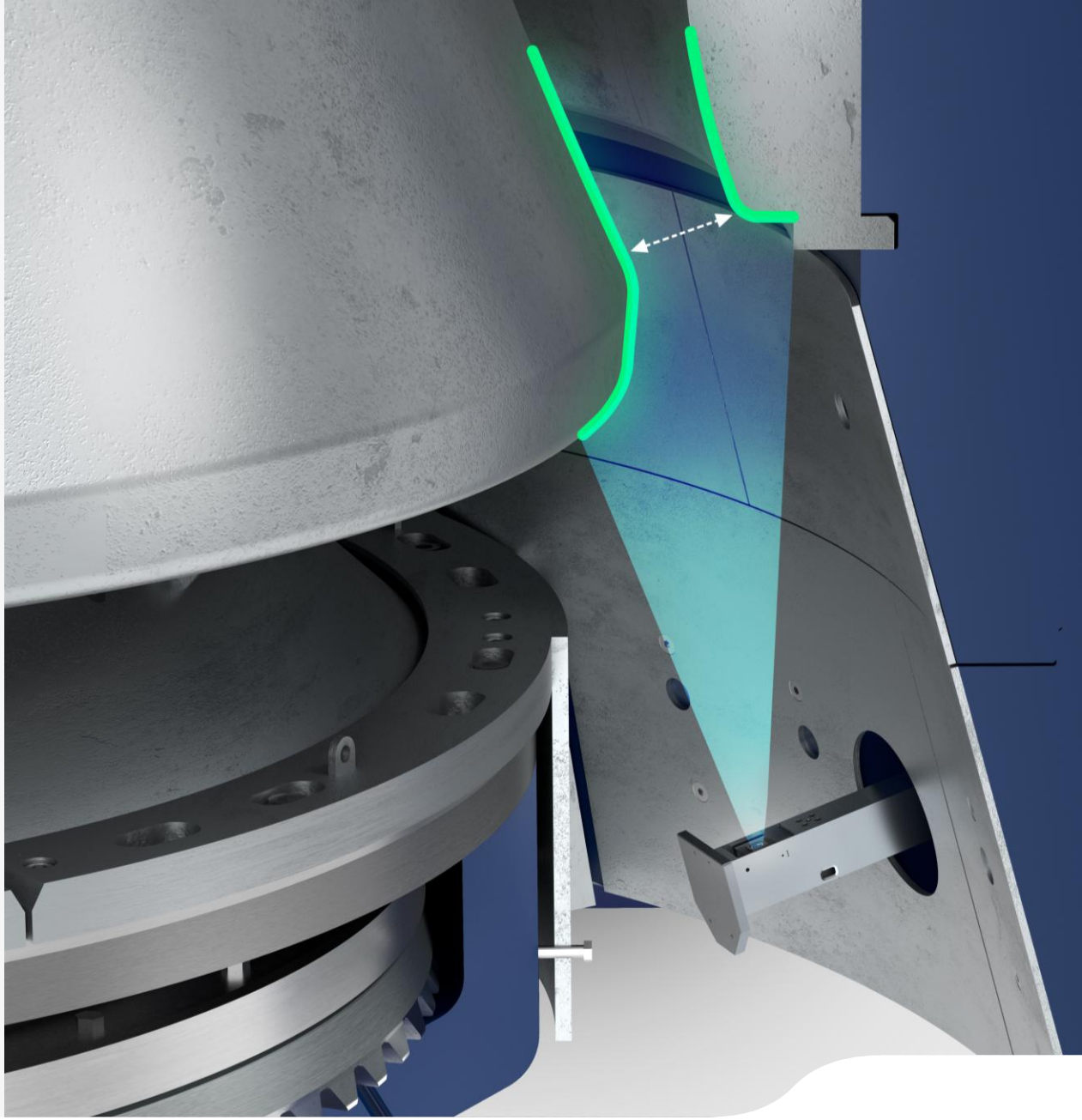
How it works

1. The camera is activated and is brought into its measuring position by a remote-controlled pneumatic pressure system
2. Camera will collect a scan of current CSS gap during operation
3. After data acquisition, the measuring camera is retracted
4. The analysis results of the scan are displayed on the connected HMI
5. The mantle can then be raised or lowered based on the CSS displayed



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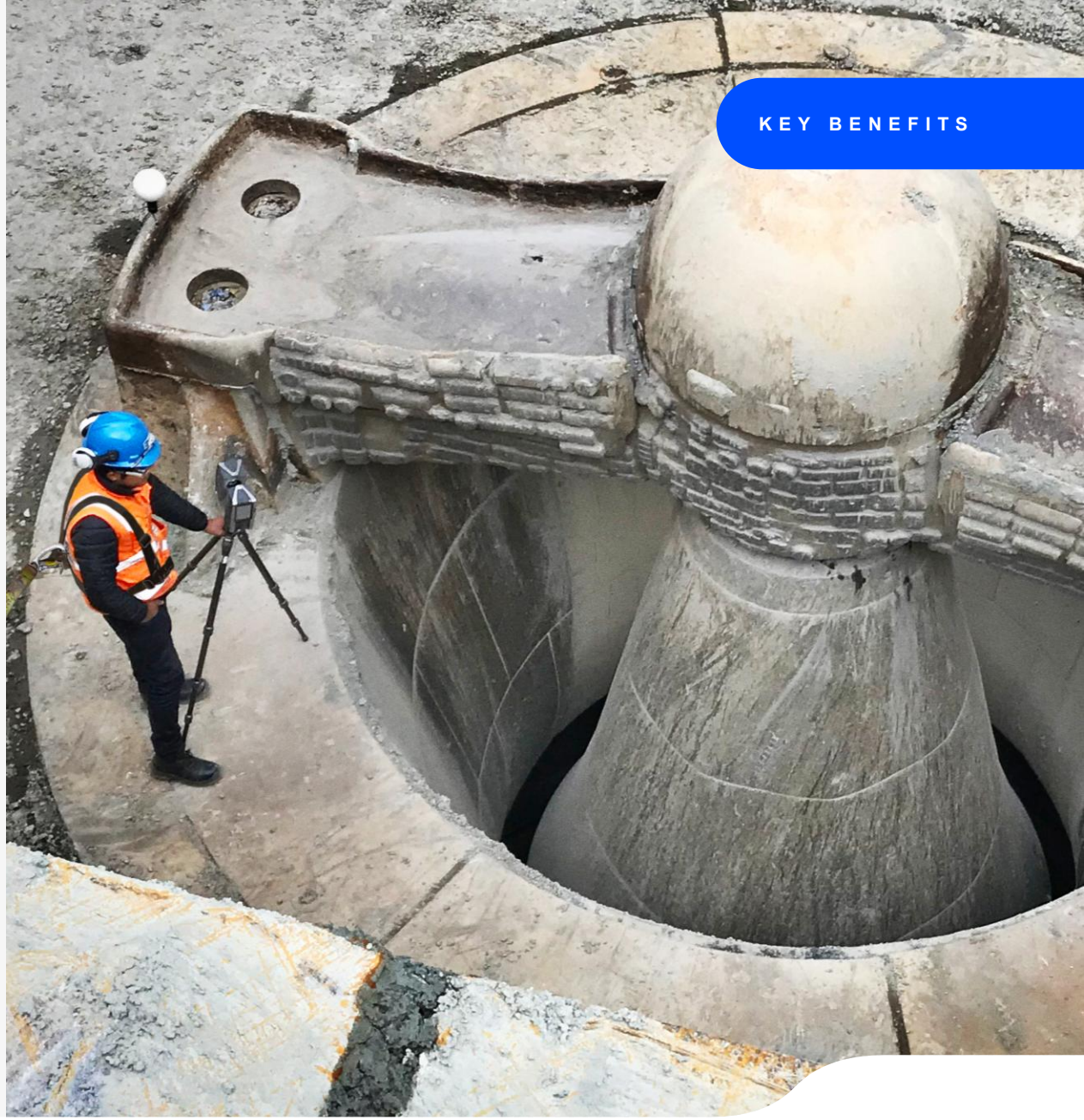
What is the value?

KEY BENEFITS

Compared to traditional methods such as aluminium foil balls, pressure balls and others, the benefits of using CrusherLensIQ are:

- **Improved safety:** Remote activation eliminates the need for operators to go to the crusher
- **More accurate, reliable & consistent measurement:** Instead of relying on the operator, the camera does all the work with the push of a button
- **Increase frequency:** Instead of waiting for shutdowns to send a team to the crusher, the camera can be activated without needing to wait for a plant shutdown to discover trends in shorter intervals



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