



Get more operating hours from heavy industrial machinery



Optimize your mining operations with precision alignment.

The mining industry presents incredibly challenging environments for heavy industrial machinery. Draglines and shovels operate year-round at remote sites in extreme climates, and reliability is crucial. Precision machine alignment is a primary requirement to maximize extraction rates and extend the life cycle of these machines. Lost production and repair costs associated with excessive vibration as well as failed bearings, hinge pins, gear sets and shafts can be staggering.

## The precision of optics

Mine owners, operators, equipment manufacturers and service providers have long trusted optical alignment systems. And for good reason: optical alignment allows you to evaluate geometric relationships such as straightness, level, parallelism, squareness and flatness between various components – and do this

to qualify machine surfaces for flatness and perpendicularity. All measurements are made using proven optical techniques that you can see, understand and verify. It's simple and very accurate.

## Aligning critical components

Establishing a bore centerline, then measuring and aligning related components, is commonly known

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in a manner that is easy to see and understand.

## How it works

A precision optical instrument called an alignment telescope is mounted to a portable base. The “scope” is aligned with reference targets, defining an accurate and repeatable optical centerline. A second type of measurement employs an optical instrument called a jig transit. This instrument sweeps reference planes

as bore sighting. In this application, a precision optical instrument (an alignment telescope) is mounted on a portable base positioned conveniently beyond the bores to be measured. The rotational centerline is defined by orienting the instrument precisely to an output drive shaft or to targets in the near and far bearings. Subsequent measurements are taken at the remaining bearings to define deviations from the optical centerline (such as vertical transmission pinion shafts, hoist case bores and hinge



lines). Mapping the components identifies the line-boring or mechanical adjustments required to straighten the bores. With our AlignCam system, field technicians make real-time adjustments while watching the target image from anywhere on the job site using a wireless mobile device.

A second measurement method uses a jig transit mounted on a portable base to check machine surfaces for flatness and perpendicularity. The jig transit's telescope rotates around two orthogonal axes, allowing it to sweep precision planes in any orientation. The technician places at least three scales on the reference surface and then aligns the instrument to sweep a plane precisely parallel to the surface. Additional measurements will qualify the surface for flatness or

set a portable machine tool to mill the surface. Once the jig transit is aligned to a surface, the telescope can rotate around its secondary axis to check additional surfaces for squareness.

### Proven technology

Draglines and shovels employ precise mechanical systems, all interrelated through complex geometric relationships with tight fitting tolerances. Optics are a preferred method for evaluating pinion bores, hoist case bores, hinge lines, swing rack pads and deck pads.

### Accurate results

Mining applications often require big things to be measured to small tolerances. Alignments of  $\pm 0.001$  inch over 17 feet are possible – that's 3 times thinner than a human hair!

### Reliably tough

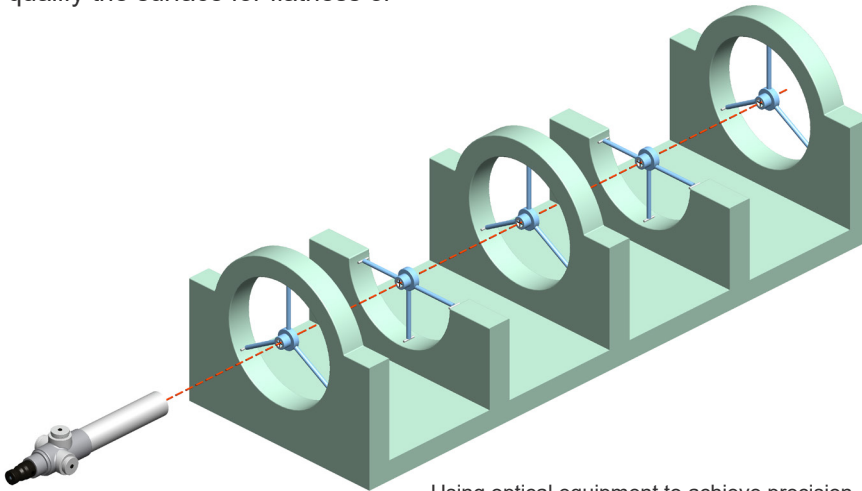
Optical instruments are specifically designed to provide high precision measurements in extreme environments like mining. Free your workspace of traditional wires and mounts that create tripping hazards and require sag calculations. There's no complex software to troubleshoot or issues with ambient light and temperature. Just instruments that perform for decades to their original manufactured tolerances.

### Manageable operation

Optical alignment principles are easy to implement because your maintenance people already apply them mechanically. You'll appreciate the easy set-up, precise operation and consistent performance of the optical alignment measurement process.

### Return on investment

Precision alignment is a core requirement for many mechanical subsystems, so it's not a surprise when our customers tell us our systems pay for themselves within months, with cost benefits continuing to grow year after year. The system is simple and the results are precise.



Using optical equipment to achieve precision alignment is a core requirement for industrial machinery. The alignment system is proven and the results are precise.

## Benefits

- Greatly extended machine life
- Minimize gear tooth wear and noise with proper mesh between gear sets
- Equalize load on upper and lower bearing pads and shaft bearings
- Extend the life of pins and hinge joints
- More accurate bore and surface cuts by aligning field machining equipment
- Minimize bending stresses in the center pin
- Reduce damaging vibration in rotational machinery

# Precision optical alignment solutions for the mining industry

## We have the right solution for you

Brunson offers a full line of optical alignment tools that can be customized to your operational needs. Contact us today and let us help you optimize your mining operations.

## Experience you can trust

### Alignment services

Let our alignment services team help you. Our team of expert field service professionals has decades of experience servicing industrial machinery. We understand how to work to your schedule in all kinds of environments. Contact us to discuss a field service engagement and learn how precision alignment can help maximize your throughput and quality.

### Comprehensive training

Experience the same success our field service teams enjoy through our expert training and application courses. We provide optical alignment training at our Kansas City facility, as well as customized on-site training to meet your specific needs.

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