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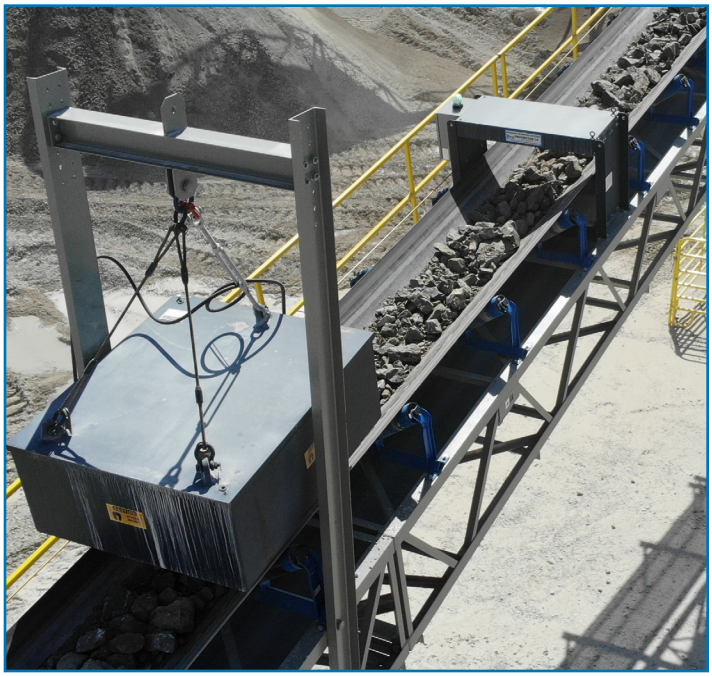
When Magnets Aren't Enough



ADVANCED DETECTION SYSTEMS®
Metal Detection Experts

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It's a common sight at any mineral processing facility; over-the-belt fixed magnets removing tramp metal from the product stream and protecting downstream crushers. With growing production demands placed on staff and equipment, and with a growing trend of utilizing recycled materials, the magnet-only operation is at risk.

Magnets are still the most-effective means of removing tramp metal and other contaminants from a product stream, but they're not always successful in protecting the crushers from damage. A large contaminant resting on the belt, with burden on top, or a bucket tooth with a high manganese content, might get past the magnet, and the resulting damage to the crusher, subsequent downtime, and maintenance and labor costs, can be staggering.

Although metal detection is not a new technology in the rock processing industry, it does seem to be overlooked at the plant level. Metal detectors have always been looked upon as a voodoo science, perceptions of the technology misunderstood, and the proper application of the detector and its operation often ignored in lieu of more pressing matters at the plant.

If the metal detector performs flawlessly, everyone is happy and the potential for damage to equipment is greatly reduced, but an improperly installed detector, or a unit that's improperly adjusted, is simply an accident waiting to happen.

So how does a metal detector actually work? Is it as complicated as we've believed it to be? The answers will surprise you.

Understanding the Machine

Metal detection is based on a very simple technology, the creation of a magnetic field and the induction of metal introduced into that field. Most metal detectors use a "balanced field" design utilizing two coils, a transmit and a receive coil.

The transmit coil creates a magnetic field broadcast at a specific frequency, and the receive coil is 'tuned' to that frequency, much in the same way your car stereo is tuned into a radio station. The conveyor belt passes through this magnetic field. The metal detector is balanced.

When metal is introduced into the magnetic field, it is electrically stimulated by the transmit coil, and creates an imbalance in the magnetic field. It is this imbalance in the magnetic field that triggers the metal detector.

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The detector can be set up to react to specific degrees of change, thereby ensuring that small items such as aluminum cans, nails, or other non-damaging metal can simply pass through, eliminating false trips and improving productivity. It is here that the proper adjustment of a metal detector is critical.

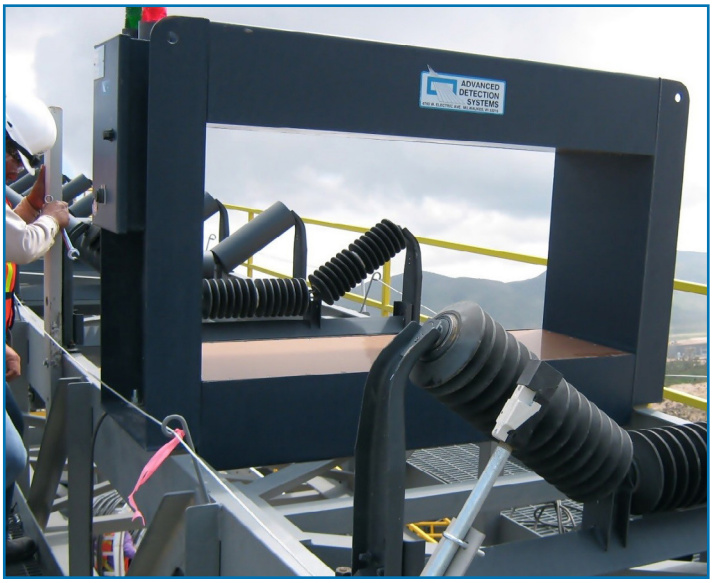
Product Effect

A metal detector is never truly perfectly and constantly balanced. Although the transmit coil is producing a stable field, external factors are always upsetting the balance of that field in small, minute ways. These factors include electrical equipment operating in close proximity to the detector, physical vibrations, and of course, the product on the conveyor belt. This is referred to as the Product Effect. Product effect will range from very small magnetic footprints, like limestone, to very large, like iron ore. Understanding the magnetic and conductive nature of your product can assist you in establishing tramp metal detection standards.

A metal detector must always be adjusted to allow the product to pass without false-trip detection. The amount of product effect also predicates the size of the contaminant that can be detected. It is physically impossible to detect a contaminant whose value is less than the product effect of the material on the conveyor. What this means to the quarry manager is that a 2-inch mill ball can be detected in crushed limestone, but the same mill ball might not be detectable in comparable amounts of iron ore.

Metal Detector Installation

Because metal detectors are susceptible to outside interference, there are several factors to consider when installing a detector onto a conveyor. The most-critical factor is location. Detectors must be far enough away from sources of external interference, such as magnets, variable-frequency devices, power transformers, and any device that creates a magnetic field.



Metal detectors require a metal-free zone, an area that typically extends outward from the centerline of the detector to 24” in either direction of the conveyor, or 48” overall with the detector in the middle. This includes the removal of steel idlers

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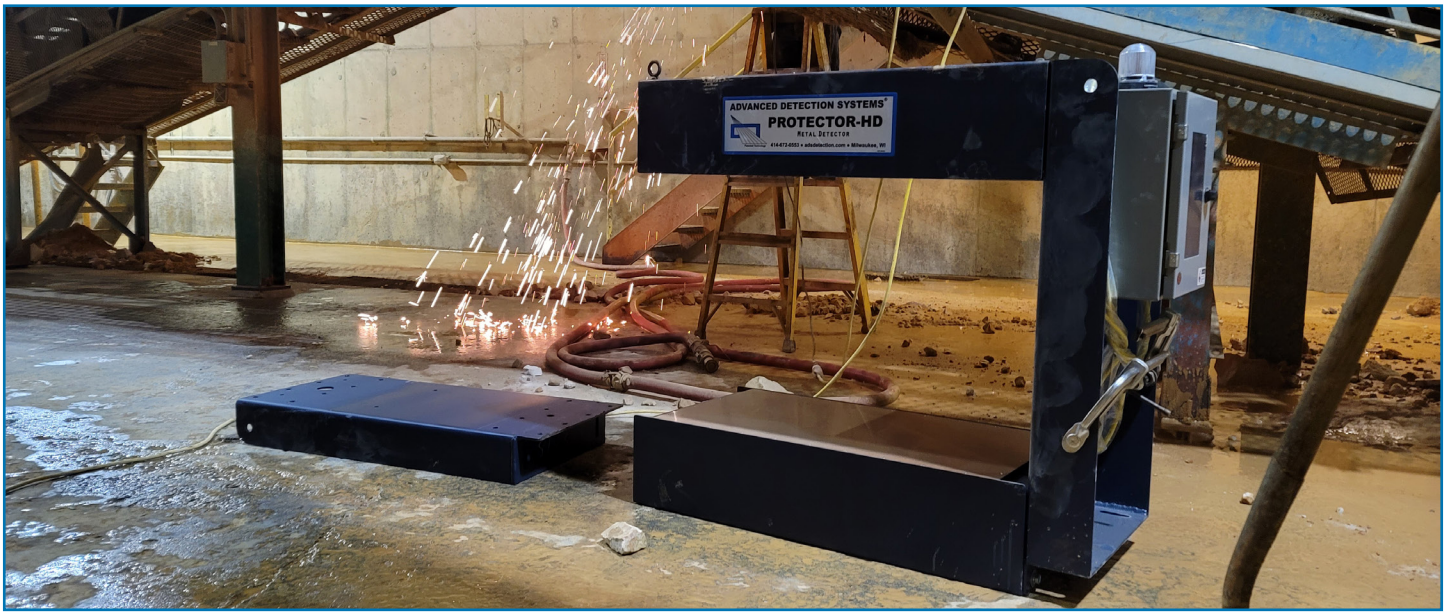

on either side of the detector. If idlers cannot be removed, then replacement with non-magnetic polymer idlers is recommended. Safety rails or other overburden devices must be replaced with non-magnetic materials such as wood, PVC or fiberglass. Any metal within the metal-free zone will upset the balance of the field and compromise the detection levels of the unit.

Metal detectors, when installed properly, are best used as a last-line of defense, getting anything that magnets failed to remove. Unlike magnets, metal detectors cannot remove a contaminant from a belt, it can only inform the operator that a contaminant is present and even mark the location of the contaminant if required. They can, however, be tied into existing PLCs (Programmable Logic Controllers) to shut down equipment and conveyors, or can be given master control of a piece of equipment and facilitate shutdown locally. In addition, a reject device can be tied into the detector to physically eliminate the contaminant from the product stream. The most-common is the waste gate, although hydraulic belt plows and shovel systems do exist to physically remove product from the conveyor without interruption.

A Matter of Trust

Metal detection has changed dramatically in the last 10 years, with the industry adopting digital technology and touch-screen interfaces, effectively eliminating the need for annual calibrations and perpetual baby-sitting of metal detection units. A digital Protector HD unit, properly installed and configured, can be as trouble-free as the magnets further upstream, protecting your crushers and screens from tramp metal contamination. In an ideal situation, a fixed electro-magnet, followed by a metal detector connected to a reject device or PLC, can provide superior protection for your equipment and increase productivity, efficiency, and profitability.

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To learn more, please contact us:
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Email: sales@adsdetection.com

Free Product Testing | Guaranteed Detection Levels

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Get Detection Optimized for Your Process

Have your product tested in our factory lab, free of charge. The results are used to optimize your Protector's detection levels for your specific product. We stand by this method with a written guarantee.

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Aftermarket Support with Customer Service Focus

Advanced Detection Systems outstanding metal detector service is a team effort. Our sales, engineering and service staff experts coordinate our support to meet your specific service needs.

Provide Customer Focused Service

Over the years, Advanced Detection Systems has developed a variety of services and training programs. These are designed to help our customers stay current in the best practice methods of use for their metal detectors, optimizing the value of their metal detection investment. Your purchase of a metal detector from Advanced Detection Systems includes expert technical support for the life of the equipment. This includes installation, start-up and the testing needs for your metal detection system. Some of the services we offer are: Verification Services for any make/model metal detector, On-site Field Service, Metal Detector Training, Software Upgrades and FREE Product Testing with guaranteed detection levels. Service is provided from our service technicians, factory sales and local representatives that are HACCP (Hazard Analysis Critical Control Point) certified. Our engineering, factory sales staff and local manufacturer's reps are also on standby to assist our customers.

Free Product Testing

Use our free product testing service to ensure that you are investing in the best possible metal detector for your application. Advanced Detection Systems product testing service is conducted promptly at our factory lab in Milwaukee, WI - USA. Our up front product testing leads to trouble free start-up of the metal detection system at your facility. This service allows us to build the metal detector for optimum performance and reliability for your specific products. When you utilize our product testing service, you will receive a factory Sensitivity Guarantee indicating the optimal ferrous, non-ferrous and stainless-steel detection levels for your specific products.

Metal Detector Verification & Services

Advanced Detection Systems HACCP (Hazard Analysis Critical Control Point) certified factory service technicians and certified local representatives conduct verification and calibration services on-site and are compliant with most QA programs, audits, HACCP and GMP (Good Manufacturing Practices) standards.

As your metal detector usage comes under scrutiny applied by government regulations, auditors and your customers; there is an opportunity to meet expectations and improve your competitive advantage by being proactive in verifying your metal detectors on an annual basis. These services are offered on any make/model metal detection system or equipment.

Metal Detector Training

We recognize the importance of quality training for our customers to ensure optimal use of their metal detector. Our training programs are conducted by certified factory service technicians and local representatives on-site or if preferred, online for our customer's convenience. Advanced Detection Systems can also customize any training program to meet your specific needs. Our training programs can include information on: Metal Detector 101 - How They Work, Security Features - Protection form Unauthorized Tampering, supervisory personnel setup and clearances, electrical power supply and operation of the metal detector, accessing and managing data settings/change, Product Monitor, use of reject devices and settings, touchscreen calibration and menu options and any specific topic per your application or industry.

Replacement Parts

Advanced Detection Systems offers replacement parts and spare parts lists for your equipment. Our factory trained service technicians, engineers and sales staff are experts on our metal detection systems. Metal detectors are a Critical Control Point and therefore must remain in service. Ask us about developing a spares part list for your specific metal detection system to prevent downtime that can be expensive and disastrous. Our staff is available to assist in identifying parts needed for your metal detector and we can easily look up the information in our system. Many parts are currently in stock and available for same day shipment, including electronic replacement parts that are unique to your specific metal detection system.

Field Service

We have responsive HACCP (Hazard Analysis Critical Control Point) certified service technicians and local representatives at your service. We offer a variety of plant level metal detector services that will ensure consistent metal detector performance and employee familiarity with the operation of your metal detection systems, such as: on-site trouble shooting for metal detectors, conveyors and reject devices, metal detector start-up and employee training, verification services, metal detector software upgrades and metal detector testing.

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