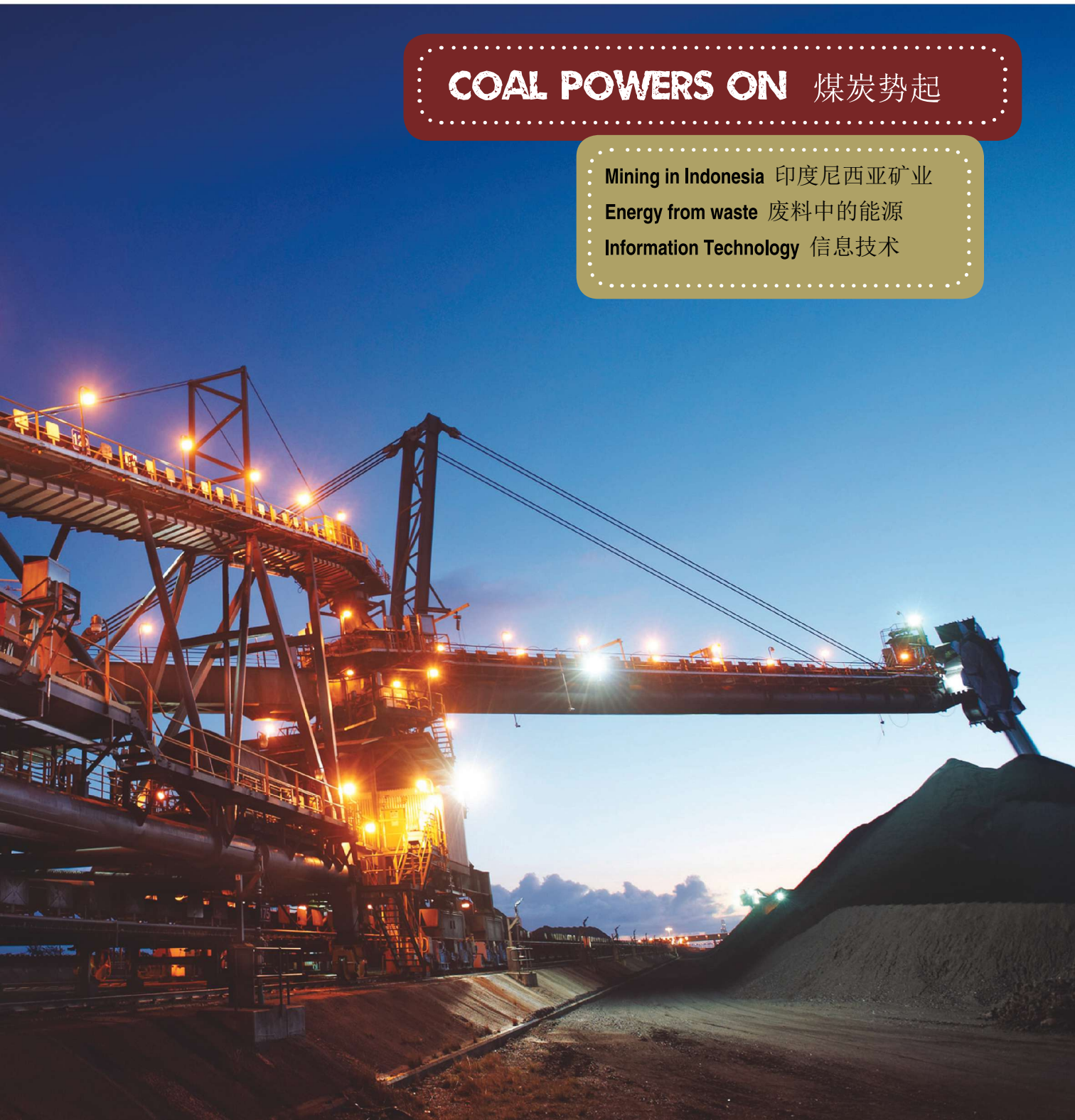
亚洲矿业 Your gateway to Asia 通往亚洲的大门
www.asiaminer.com
The ASIA Miner
Asia Pacific's bi-lingual Resource Industry Magazine 亚太双语资源产业杂志
Volume 14 | Issue 2 | Industry Technical Information | 矿业技术信息

COAL POWERS ON 煤炭势起

Mining in Indonesia 印度尼西亚矿业
Energy from waste 废料中的能源
Information Technology 信息技术



Monitoring boosts conveyor belt safety and efficiency

By Bernd Küsel, CBG Germany

MINING conveyor belts are subjected to exceptionally great stress from material loading impact, from countless bends, from worn and failing conveyor parts, and from foreign objects that may slit or penetrate it.

Failure or severe damage of the belt often has dramatic consequences. It is essential to detect such failures immediately when they occur, in order to be able to take appropriate measures before things get worse.

Monitoring systems based on radiographic technology, similar to those used in medical diagnostics, are well on the way to revolutionising the safety and operating efficiency of conveyor belts.

This article describes the CBGuard system.

Benefits

Having a conveyor belt permanently monitored obviates the need for time-consuming, insufficient visual inspections and temporary system shutdown. Repairs are performed at the optimum point of time - not unnecessarily early and not too late.

The monitoring unit is permanently and exactly informing about the severity of injuries and deficits. This allows damages to be remediated within the scope of scheduled maintenance stops. With visual evaluation this would give reason for immediate, non-scheduled repair and conveyor downtime.

The CBGuard system measures the exact belt thickness and yields timely information about the upcoming need for a replacement. Hence, maximum lifetime can be obtained from the conveyor belt.

Exact, continuous status reports not only offer cost benefits, they also increase safety. Arising damages, not still visible from the outside, can be eliminated in a timely manner. Serious damages, for instance broken or corroded steel cords, trigger an alarm, which advises the belt operator to carry out the repair as soon as possible. The X-ray unit is an important part of the preventive maintenance program.

Extremely critical failures like the commencing opening of a belt splice or the slitting of the belt automatically stop the belt drive. That way, dramatic consequential damages, for personnel and plant, are avoided.

The X-ray scanner digitises the entire belt - virtually every cubic millimetre of the belt is captured. That way, the X-ray system can be integrated into the Industrial Internet of Things. A reconciliation with the control units of other components is enabled. Since the X-ray also detects material build-up on the belt, it is possible to automatically demand corrections of the cleaning devices.

In combination with other elements of the logistical chain, the optimal time of the next maintenance stop can be scheduled.

The condition of the belt can be observed from any place in the world in real-time over the internet.

Who needs it?

The industry is in a new phase where the need for integration, innovation and holistic thinking to operate successful mines is replacing methodologies of the past. X-ray scanners are a central part in this new environment and use of an X-ray belt scanner is recommended for all long or critical conveyors.

Originally, the request for an X-ray system came from underground coal mining, because a visual assessment of the conveyor belt is difficult. Under the Safety First rules, belts were replaced, because it was assumed they were not reliable anymore. Assets were burned because of lack of information. There are hundreds of X-ray systems now operating in underground mining.

Particularly important is the X-ray scanner for steel cord conveyor belts. Damages to such long and expensive belts can have catastrophic consequences. In most cases they are the lifelines of mines, power plants and ports.

Mode of operation

The software generates an intelligent, holistic analysis of any kind of threat to the belt. The current condition of the belt and the splices is compared with the target condition. Any deviation triggers a customised action - from a warning to the automatic shutdown of the conveyor system.

The CBGuard scanner is suited for a belt width of up to 3200mm, a belt thickness of up to 60mm and a velocity of up to 9 m/s.

The device is very compact. It fits in almost all conveyors. The preferred installation place is in the bottom part of the conveyor (the return run) as the belt needs to run flat (not troughed) through the device.

A concrete foundation and a safety fence have to be provided. Only authorised, qualified personnel will have access to the system. The scanner itself is equipped with several safety devices. At the fence, about 2 metres away from the generator, the radiation is equal to the normal environmental radiation.

Before work on the device, it is switched off in the control room. When turned off, there is no radiation.

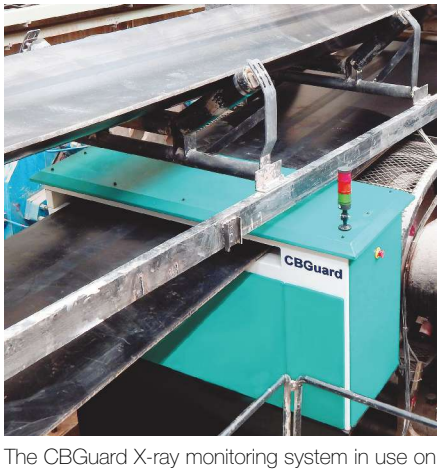
The program is intuitive and very easy to use. Remote servicing is possible anytime.

The scanner is almost wear-free, because it has no moving parts or contact with the belt. The device signals in good time when the X-ray tube, which normally has a lifetime of some years, is about to be replaced.

Conclusion

X-ray technology in combination with sophisticated software has begun a triumphal march with regard to conveyor belt health monitoring. No other independently working system or technology is capable of providing and processing such a wealth of detailed information.

The reduction in operating cost and the increase in safety are most convincing arguments for the implementation of these state-of-the art scanners.



The CBGuard X-ray monitoring system in use on a conveyor belt.