

MINING TECHNOLOGY FIT FOR THE FUTURE THANKS TO TAILORED MACHINE DESIGN

TECHNICAL APPLICATION

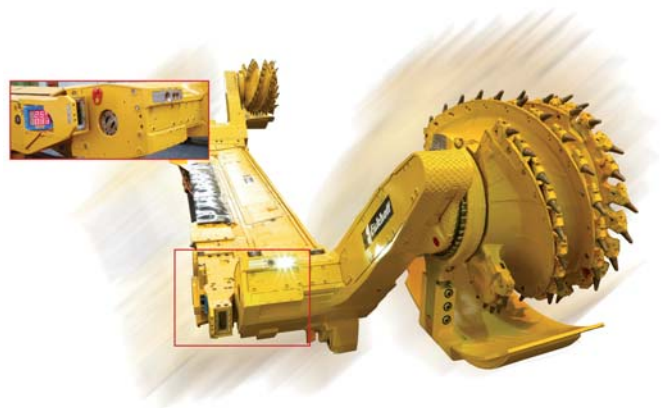


Innovative shearer loader for safe and highly efficient coal mining operations

In global terms, coal is the most important raw fuel. Its stocks are distributed throughout the world and are almost inexhaustible. Eickhoff Bergbautechnik GmbH in Bochum, Germany manufactures high-performance machines for the domestic and international mining industry.

Shearer loaders are one of its focuses.

In straightforward terms, these are mining machines which use large rollers to cut the coal from the seams. With a power output potential of 300 – 1000 kW, up to 1 million tonnes per month can be extracted. This is made possible by the development of a completely new, extensive automation package. The machine automatically locates the limits of the bed of coal and then proceeds to extract it autonomously. A navigation system guides the machine within the naturally formed coal seam. The operators, meanwhile, can concentrate on monitoring functions in a safe, unpressured environment and do not have to deal with the harsh environment encountered in mining, including dust, falling rocks, damp, noise and restricted vision. They can then operate all the system's monitoring and optimisation tasks from the control centre. Eickhoff Bergbautechnik GmbH also clearly emphasises the aspects of environmental protection and protection of resources here: "Selective extraction saves over 1 mil-



lion tonnes of CO₂ per year by bringing less worthless encasing rock to the surface along several kilometres of belt conveyors and shafts. The extraction of thin seams, which otherwise often had to be left in a deposit and were therefore irretrievably lost, can now be resumed in fully automated mode. This affects most coal deposits around the globe."

The high degree of automation in these systems naturally also calls for an extremely high level of electrical safety and reliability, with particular care being given to operator protection. Electrical networks in underground mines are mainly operated as unearthed systems (IT system) with warning/shutdown. The standards covering protection practice in mines to DIN VDE 0118-1 (VDE0118-1) and DIN VDE 0118-2 (VDE0118-2):2010-06 are applicable here. Under these special conditions the use of the IT system ensures low touch voltages, low fault currents and thus a low risk of explosion and fire. The IT system



also guarantees high availability since an insulation fault does not result in a power supply failure. This benefit is also a key factor in being able to achieve the extraction performances mentioned. As the insulation monitoring device used transmits messages as appropriate, this means maintenance can be optimally coordinated.

“THE NECESSITY FOR INSULATION MONITORING DEVICES CAME ORIGINALLY FROM THE MINING INDUSTRY.”

The 460...690 volt systems are monitored by type IRDH275W ISOMETERs® which feature high shock and vibration resistance. The AMPPlus measurement method allows this device to meet the requirements of modern power supply systems which often include converters, power converters, thyristor regulators and directly connected d.c. components. Explosion protection regulations require them to be fitted in pressure-resistant power distribution systems.

The necessity for insulation monitoring devices came originally from the mining industry. Company founder Walther Hans Bender recognised this as early as 1937 and in 1939 patented an “insulation monitor and earth fault detector for 3-phase systems” under the name ISOMETER®, which is now known throughout the world. Even back then the main application fields were in potash, ore and coal mines. ■

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