R+W COUPLING TECHNOLOGY

DRIVE

NEW PRODUCTS FOR NEW APPLICATIONS

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Solutions from R+W

Customer: NFM
Application: Tunnel boring machines
Solution: ST 1 / 10

Reinforced bearings allow for a long period of disenegagement

One of the most demanding applications for ST model series safety couplings is in tunnel boring machines. R+W meets this challenge with brilliance.

These systems are employed around the world for boring through all types of rock but how does such a system work?

A rotating cutting disc, with up to 30 individual cutting heads arranged over its entire cutting surface, is pressure-driven forward to break up the rock in its path. A screw conveyor inside the tunnel boring machine removes the crushed material from the excavation area. Systems behind the boring machine process the material removed into a mass that is then used to clad the tunnel's walls.

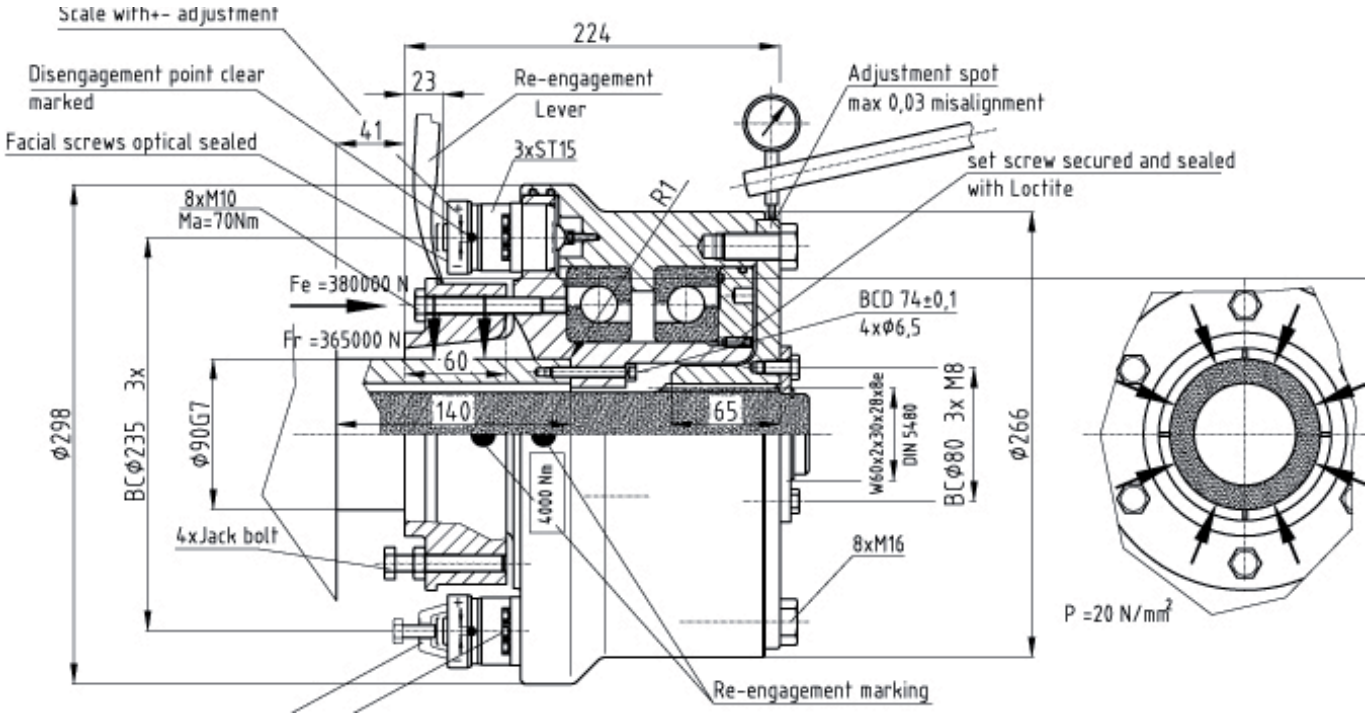
What demands had to be fulfilled by R+W to overcome the harsh conditions prevailing more that 100 meters under the earth's surface?

First of all, the main gearbox for each individual cutting head must disconnect within milliseconds in the event of an overload condition. Furthermore, in such a situation the safety coupling must internally release without producing residual backlash or wear in its internal components because, after a load disconnect, the flywheel inertia at 2500 RPM can take up to half an hour to run out. A second requirement is that the coupling's overall weight my not exceed 65 kg.

This is because the ball bearing in the motor's rear bell must bear the weight of the coupling. A third requirement is that the coupling must be sealed against the intrusion of abrasive dust and dirt. The seal may not impinge on the coupling's compact design.

The R+W solution is based on a ST 1 / 10 model series safety coupling with a preset disconnect torque of 4200 Nm. Two single-row angular-contact ball bearings counteract the occurrence of micro-movements caused by the severe vibration stresses inherent to a load disconnect. This ensures precise repeatability for load disconnect as well as the coupling's strength over its service life.
The last challenge was the coupling's seal because it is subject to very high circumferential speed. Its requirements were met by a labyrinth-like seal realized with additional special sealing rings on the inside.

R+W deliberately chose this solution. This is because other types of seals, internal to the coupling, always increase the coupling's installed length.



Customer: Reifenhäuser
Application: Extruder
Solution: ES2 / 1500

Aluminium Hubs allow for a low moment of inertia

The Reifenhäuser Gruppe is the world's largest and leading supplier of machines and equipment for plasticizing thermoplastic plastics. Extruders are the initial basis for high-quality, versatile products.

The task presented to R+W was to incorporate a safety coupling between the extruder screw and the gearbox. The specifications that were prescribed for dimensions, load-disconnect value, and the coupling's hub connections made this a real challenge.
A vibration-damping characteristic was requested to reduce transmission of the screw's operating vibration back to the gearbox.
The safety component of a model SK1/1500 safety coupling was combined with a type EK2 elastomer coupling to create a solution for these requirements. This produced a compact coupling with a higher power density. Connection of the coupling to shaft journals was accomplished with a clamping hub on one side and the other side by way of a conical clamp on the safety component.