



CUSTOMER SERVICES

FOR
OEM SHAFT HOISTING TECHNOLOGY
OEM MATERIAL HANDLING TECHNOLOGY
COOLING AND VENTILATION TECHNOLOGY

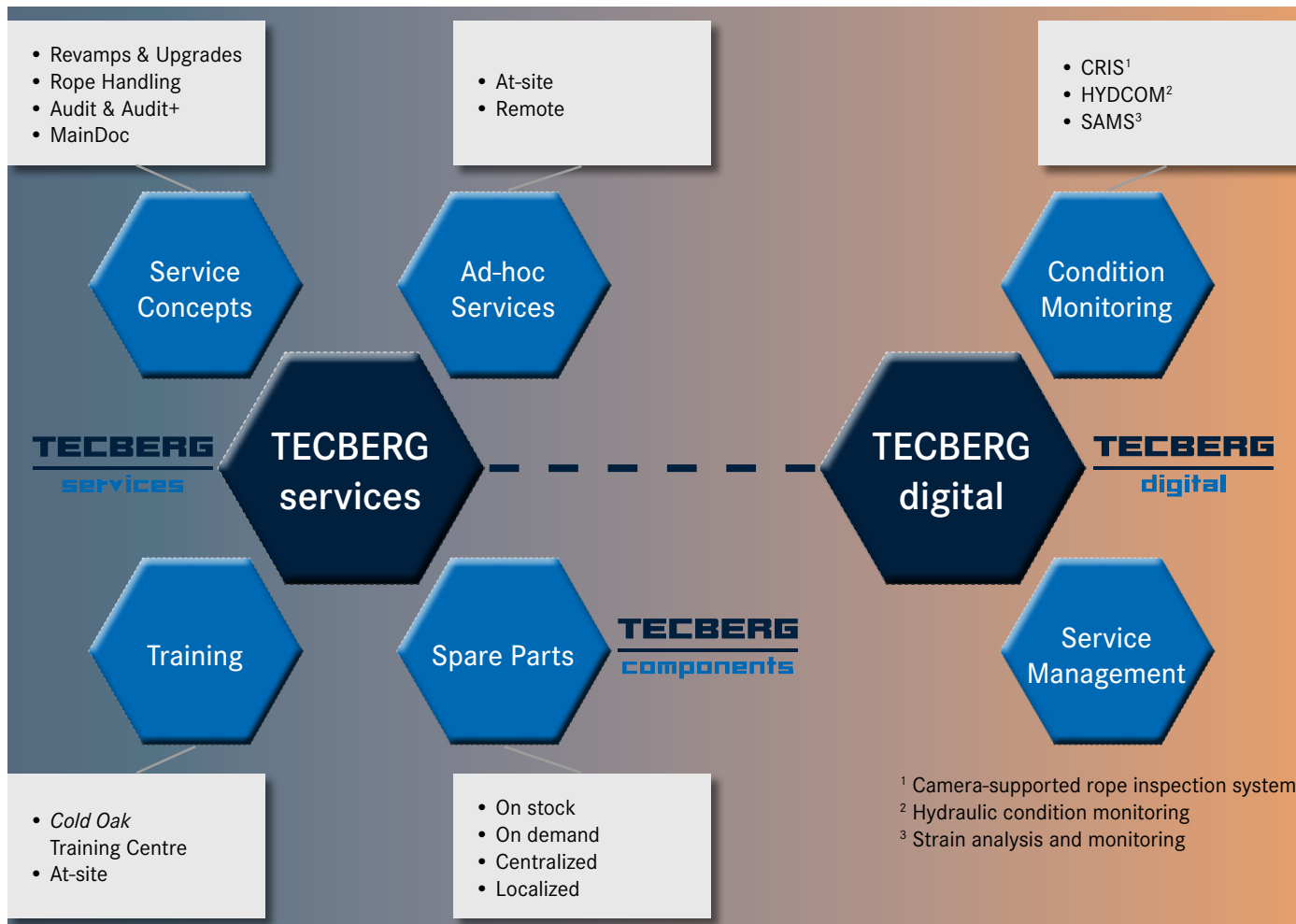
IN
UNDERGROUND MINES AND UNDERGROUND WASTE DEPOSITS

PRECISELY ADAPTED SERVICES FROM SIEMAG TECBERG GROUP
- AS INDIVIDUAL AS YOUR MAINTENANCE OBJECTS!

**SIEMAG
TECBERG**

group

TECBERG services modules



Increase productivity and safety

Your requirements

Complex shaft hoisting systems are supplied with a defined annual output, whereby the output of hoisting machines and conveying equipment is precisely aligned with the mine operator's production planning, which is typically based on maximum plant efficiency and availability.

The latter two are related to the quality aspect of shaft hoisting technology - which implies the fulfillment of premium quality - and on the other hand demonstrate the high interest of mine operators in maintaining the value of their investments against the background of an optimum technical product service life - this is where sophisticated, tailored service concepts come into play on the supplier side, which already include efficient service management.

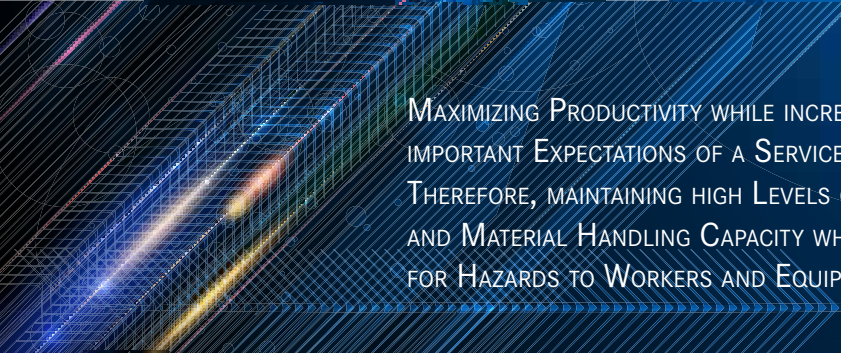
Our experience

During the construction phase of the Swiss Gotthard Base Tunnel, SIEMAG TECBERG was itself the plant operator of extensive shaft hoisting systems over a period of 10 years. This has given our experts a fund of experience that is certainly unique in the world and, moreover, the self-confident realization that high plant quality only develops its full performance potential in conjunction with sophisticated service concepts.

SIEMAG TECBERG implements service concepts as integral components in the shaft hoisting technology delivery programme

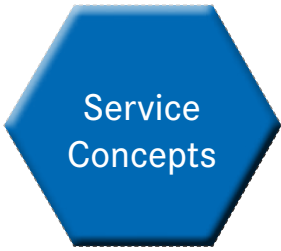
Our service concepts

- are appropriately set up in a modular fashion, i.e. distinguish between plant structuring (relevant maintenance objects), inspection, documentation, recommendations for action and, if necessary, offers for the installation of spare parts and the resources required for this.
- They take into account the country-specific requirements or inspection and maintenance obligations of the local supervisory authorities in maintenance plans and inspection activities, and are thus elementary for the maintenance of the operating licence of the plants.
- They take into account the geographical mine-operator/supplier situation, are therefore also economically balanced and offer a sensible mix of maintenance services by the mine-operator´s service personell and selected support by SIEMAG TECBERG experts, coupled with the deadlines for maintenance measures, which are defined by the fixed maintenance intervals of plant components.
- If the aspects listed so far are still at the level of classic service concepts, these - if requested - also incorporate the benefits of digitally based [condition monitoring](#), which provides mine operators with a compact overview of the wear reserves and impending damage to plant components. For this purpose, in addition to the sensor data of the plants, selected process data is also processed on site or transmitted to a [monitoring centre](#) via a secure VPN connection and processed there in a database-based and self-learning trend analysis. Maintenance work can thus be scheduled during non-production periods and the necessary resources can be planned at an early stage.
- In addition to visualisations, alarm messages and reports from digital condition monitoring, this in turn offers automatic feedback to digital service management. Condition monitoring triggers concrete maintenance proposals with recommendations for action that can be conveniently and efficiently integrated into maintenance planning in digital service management.
- Service concepts in the more traditional sense - or nowadays increasingly in combination with and cleverly supported by digital asset and maintenance management on a software basis - offer the mining industry a trully efficient option in maintaining the value of its assets.



MAXIMIZING PRODUCTIVITY WHILE INCREASING SAFETY ARE THE MOST IMPORTANT EXPECTATIONS OF A SERVICE CONCEPT. THEREFORE, MAINTAINING HIGH LEVELS OF OPERATING EFFICIENCY AND MATERIAL HANDLING CAPACITY WHILE REDUCING THE POTENTIAL FOR HAZARDS TO WORKERS AND EQUIPMENT ARE KEY TO SUCCESS.





Revamping, modernization and capacity increase System upgrade with higher payload, hoisting speed, etc. CAPEX services such as engineering studies

Revamps & Upgrades

The SIEMAG TECERG group expertise covers but is not limited to the following examples of revamping, upgrade and modification projects:

Revamping, upgrades and modifications

- ECN = engineering change notice = small changes to functionality of system, e.g. HMI changes
- Conveyance replacement & upgrade e.g. for increase of payload

Automation upgrades

- Partial or complete change of control systems
- Drives conversion = dc-drives → ac-drives
- Vf-drive replacement
- Speed distance protection
- Rectifier and control system update

Brake upgrades

- Shoe brake → disc brake
- Fixed shoes → pivoted shoes
- Brake engine rebuilt
- Pneum. → hydr. controls

SIL-upgrades

- Brake controls
- Speed distance protection

Energy efficiency upgrades

- Power factor improvements

Support equipment

- Sheave refurbishment

Communication systems upgrades

- TECOM
- Shaft signalling

Rotating mass upgrades

- Drums, shafts, clutches, bearings,
- Gears (inspections partially with ext. experts)

Relocation

- Uplift, refurbishment and reinstalation of winders

Conversion

- Integrated Koepe → Single-rope drum winder

Rope Handling

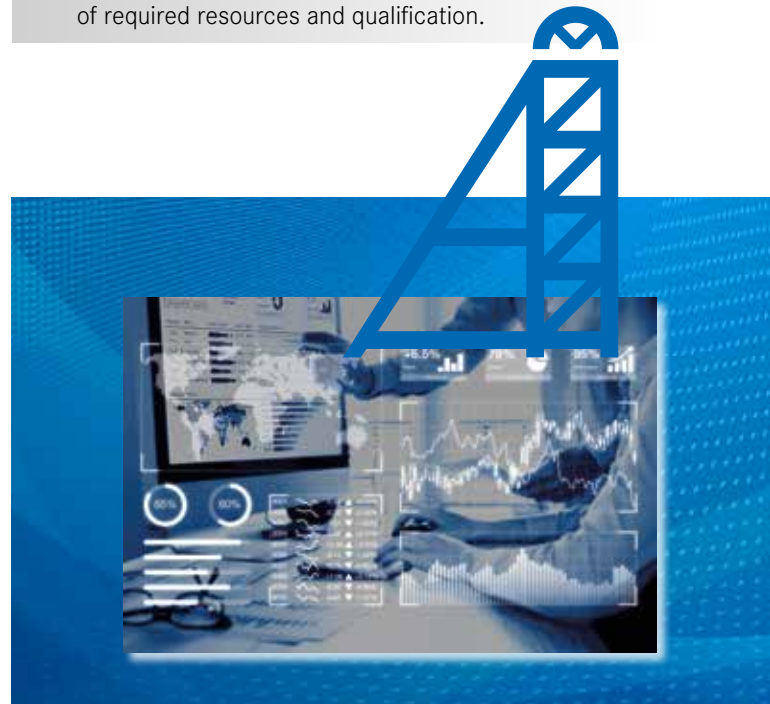
- Initial rope installation, rope replacement, rope end cutting, providing method descriptions, rope handling equipment (e.g. friction winch, clamping & lifting device, winches, clamps etc.), “supervision only” or “supervision & staff”.

Audit & Audit+

- Inspection, available in intervals, i.e. semi-annual, annual or bi-annual, covering „entire hoist“ or selected „functional units“, following a pre-defined, individually adapted schedule, followed by action plan and recommended spares, if required: offer for installation of spares as follow-up to Audit. Audit+ additionally includes a pre-defined volume of maintenance tasks and/or selected inspections by sub-contracted 3rd party experts.

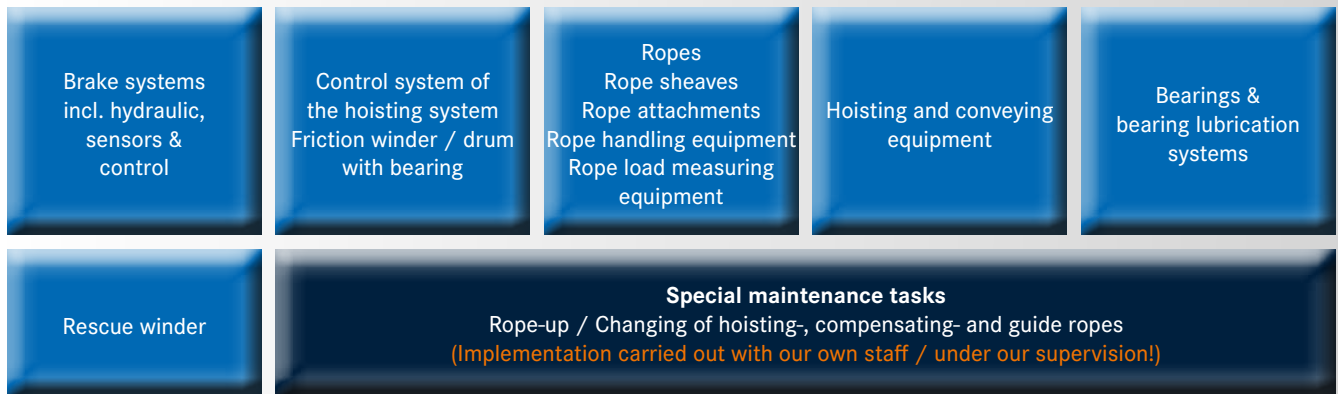
MainDoc – Maintenance Documentation

- Operational set of additional templates (for analogue or digital use with tablet), based on operation & maintenance manual.
- Incl. tailored checklists, method description, summary of task-related technical data, required tools, directory of required resources and qualification.



SIEMAG TECBERG can support to analyze the existing equipment, provide and install customized solution, following the new requirements and basic data.

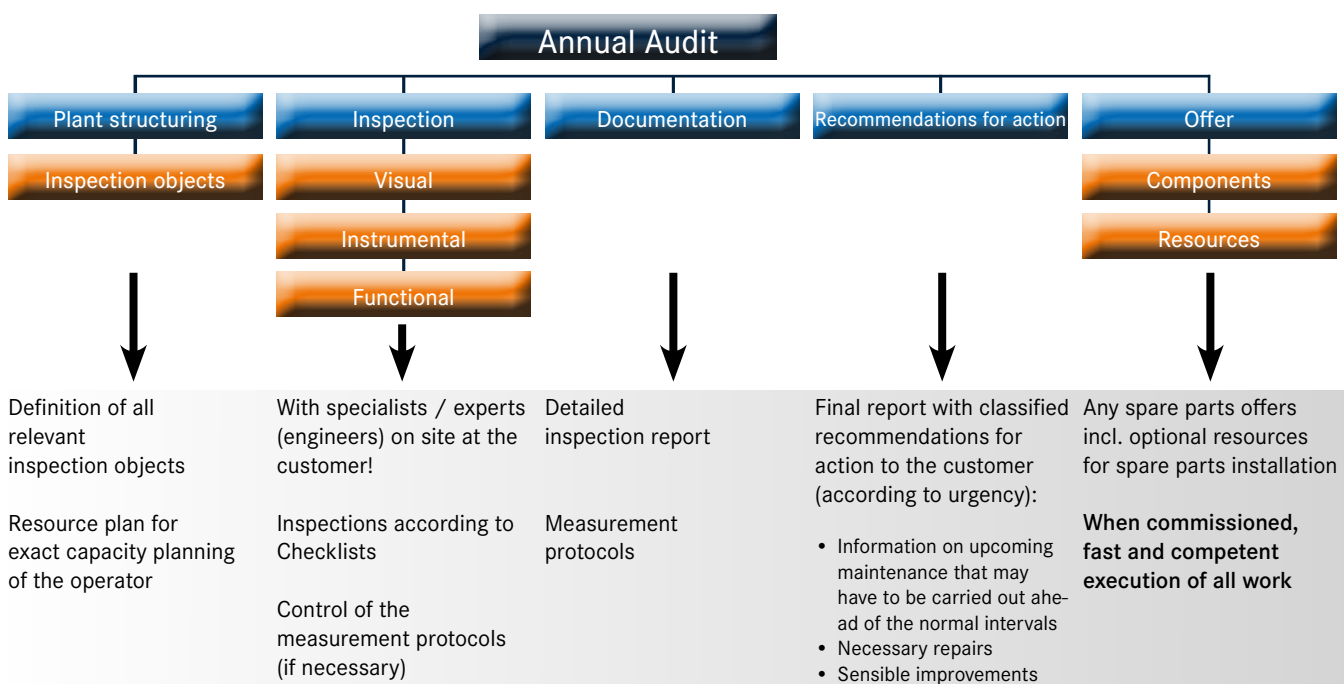
Even with continuous maintenance and regular inspections, after a certain time of operation each plant needs to get an upgrade in it's equipment. We can offer customized solutions for modernizations and upgrades of the complete shaft hoisting technology, including the most frequently needed replacement parts.



Service concepts for shaft hoisting equipment in nuclear repositories naturally take into account all guidelines, requirements and specifications of national and international nuclear regulations.

Service concepts in practice

Modular elements of service concepts using the example of the „Annual AUDIT“ service concept





We have a global network of subsidiaries and partners on every continent. This means we can provide you with rapid on-site support or remote maintenance if required.

Ad-hoc Services

Technical services on demand, remote or at site

At site: standard service on demand

- Emergency support and troubleshooting in case of break-downs
- Planned maintenance (covers all required disciplines, i.e. mechanics, hydraulics and automation)
- Inspections and system diagnostics

Remote

- Online diagnostics for drive controller
- Mentoring of local service technicians by experienced SIEMAG TECBERG service experts via AR-glasses and e.g. MS-Teams or equivalent

SIEMAG TECBERG services are traceable and transparent, providing a full reporting with recommended actions and with billing as per fixed schedule of rates.

A complete inspection of all parts of the plant in combination with a customized spare parts plan are effective measures to keep the system running stable without unplanned operational down-time.



Services on a global scale

Thinking the future of our customers

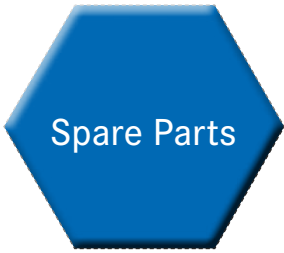
A traditional customer-supplier model is far too little complex for modern business processes. That's why SIEMAG TECBERG group understands key account and services in the sense of profound partnering, as a collaborative approach to achieve shared objectives.

Partnership is the process by which manufacturer and customer create synergistic solutions to their challenges - both thinking and rethinking the future of their disciplines.

The great commitment of our highly qualified staff is a major force behind the excellent reputation of the products and services at reputable international raw-material and energy companies and project companies working on infra-structure projects. The experts ensure the complete and reliable performance of installation and service works and are always available to assist you at short notice.

Our customers operate globally. So does our service!





Modern spare parts supply and spare parts solutions that are precisely tailored to the individual needs of our customers.

Spare Parts

SIEMAG TECBERG provides spare and wear parts for its own OEM-products as well as for 3rd-party sourced products and components, covering mechanics, hydraulics, electrics and automation according to the following classification:

OEM Spare Parts Hoisting Technology, Material Handling, Cooling and Ventilation Technology

- Brake Calipers
- Hydraulic Components
- Rope Attachments
- Conveyance Components

Spare Parts Automation and Drive Technology, Control and Automation

- Drive & Motor Components
- Automation Components
- Sensors
- Transformers



Shortest availability for identified spares

- from central stock with automated high-bay warehouse at SIEMAG TECBERG Germany
- from de-centralized regional stock nearby mine site
- from local consignment stock at mine site

Efficient forwarding

- Logistic chain **fully covered** directly from SIEMAG TECBERG to mine site

Surplus

- Spares inventory audit available







A decisive aspect for the efficient start and further operation of new hoisting systems is the early training of personnel in the operating area, services and maintenance.

Training

- During or shortly after installation / commissioning (typically part of main contract)
- At “Cold Oak Training Centre” at the headquarters of SIEMAG TECBERG in Germany
 - Comprehensive training and instruction of your employees already before commissioning
 - Maximum plant operation on site directly from the start of your hoisting system
 - Safe and efficient conveying operation based on advanced human-machine interfaces
 - Efficient use of maintenance personnel
 - Complete and clear training material / documentation
- Maintenance training at site

Cold Oak Training Centre

In 2011, the company’s own training and education centre with a worldwide unique hoisting machine simulator was opened on the premises of SIEMAG TECBERG Headquarters (TECBERG park).

The „COLD OAK“ technical centre is an innovative training and education centre integrated into the winding tower, which is visible from afar, and has a simulator for controlling a winding machine that is unique in the world. With these state-of-the-art test and training opportunities, we offer our customers for example training and education of hoisting machine operators, maintenance and service personnel.

In an inspiring atmosphere, your employees will learn how to fully master all essential operational plant conditions for the safe and effective operation of your hoisting systems via widely optimized Human-Machine Interfaces (HMI). Not only all standard machine operations can be practiced under virtually real conditions, but also more specific procedures such as restarting the hoisting technology after a standstill. In this way, we create together the prerequisites for smooth commissioning and trouble-free operation of our hoisting systems at a later date.

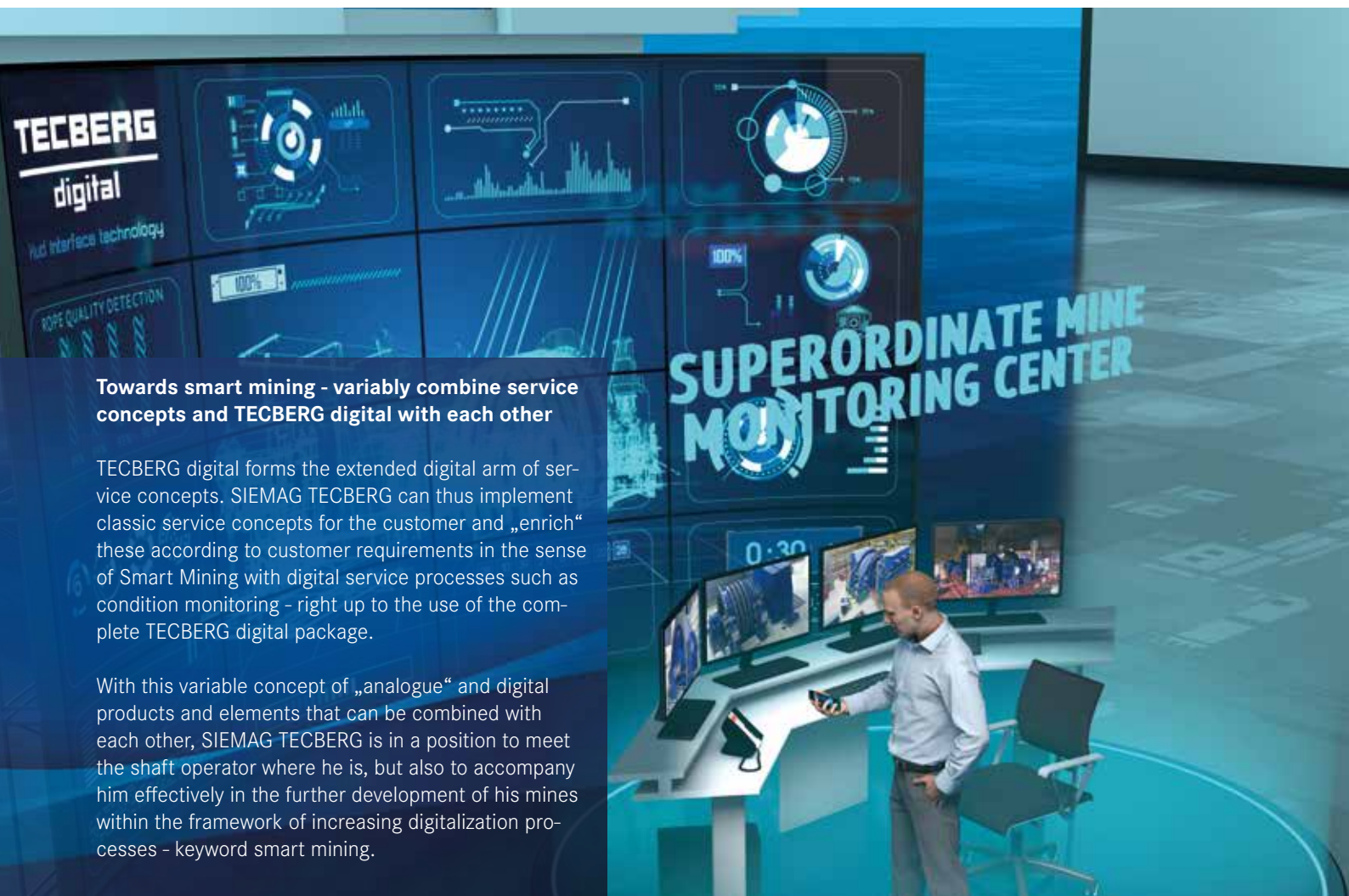




The digital extension of service concepts with TECBERG digital

SIEMAG TECBERG understands **TECBERG digital** as a range of digital products and services for shaft hoisting systems. This complete package consisting of a modular software platform and analysis services optimally supports plant operators in plant diagnosis and maintenance management as well as comprehensive service management.

- Condition monitoring (Monitoring of wear reserves and component-related trend analyses of incipient damage). Among others with the individual solutions
 - **CRIS** (Camera-supported Rope Inspection System)
 - **HYDCOM** (Hydraulic Condition Monitoring for Brake and Bearing Fluids of Shaft Hoisting Machines)
 - **SAMS** (Sentinel Analysis and Monitoring System)
 - **Vibration Monitoring** (for roller bearings)
- Service management (Planning, control and monitoring of all maintenance measures)



Towards smart mining - variably combine service concepts and TECBERG digital with each other

TECBERG digital forms the extended digital arm of service concepts. SIEMAG TECBERG can thus implement classic service concepts for the customer and „enrich“ these according to customer requirements in the sense of Smart Mining with digital service processes such as condition monitoring - right up to the use of the complete TECBERG digital package.

With this variable concept of „analogue“ and digital products and elements that can be combined with each other, SIEMAG TECBERG is in a position to meet the shaft operator where he is, but also to accompany him effectively in the further development of his mines within the framework of increasing digitalization processes - keyword smart mining.

With service concepts from SIEMAG TECBERG:
- Maximum preservation of the value of your assets
- Maximum productivity



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