Completely Integrated Solutions
for the Mining Industry

SIMINE^{CIS} DRAG

The future is gearless

Your Success is Our Goal

SIEMENS

Industrial Solutions and Services

SIMINE^{CIS} DRAG is our electrical system solution for Mining Draglines. These machines have been powered by Motor-Generator sets for more than a century and have been one of the last hold outs of this aged technology. Our solution replaces all Hoist and Drag M-G sets with AC IGBT drives and uses a slow rotating ring motor to drive Hoist and Drag drums without mechanical gears. We believe this technology will become the standard of choice in the future.

The challenge

Even with old, rotating DC technology, draglines are the low cost producer, when "mountains" of overburden need to be moved to uncover coal or other minerals in open pit mines. Our challenge was to power these goliath machines with a modern, static AC drive system which combines benefits like e.g. leading power factor and high reliability with increased productivity and reduced maintenance and operating costs.

Recent advances in drive technology using AFE's (Active Front Ends) allowed us to maintain leading input power factor. This is an absolute requirement from the power utility given that a dragline cycles between + and – 20 to 30 MW, which can make lights flicker in towns close to the pit. In addition, we applied gearless ring motors, directly coupled to the Hoist and Drag rope drums. All together we eliminated all DC generators, all mechanical Hoist and Drag gears, and all associated grease and lubrication equipment. For Swing and Walk we use geared drives with the same IGBT AC power and control hardware.

Five good reasons to choose SIMINE^{CIS} DRAG

- **Higher machine productivity**
- **Higher drive system efficiency**
- **Less maintenance**
- **Lower life cycle operating costs**
- **Seamless integration of SIMINE^{CIS} SIRAS and SIMINE^{CIS} MIDAS**

Our solution

SIMINE^{CIS} DRAG combines reliable electronics and controls proven in thousands of Siemens powered locomotives and mining shovels, with gearless ring motors which have been in reliable service in grinding mills, mine winders, chain excavators and conveyors for more than 25 years. We combined these proven, reliable components into a new, revolutionary Dragline drive system.

Higher productivity

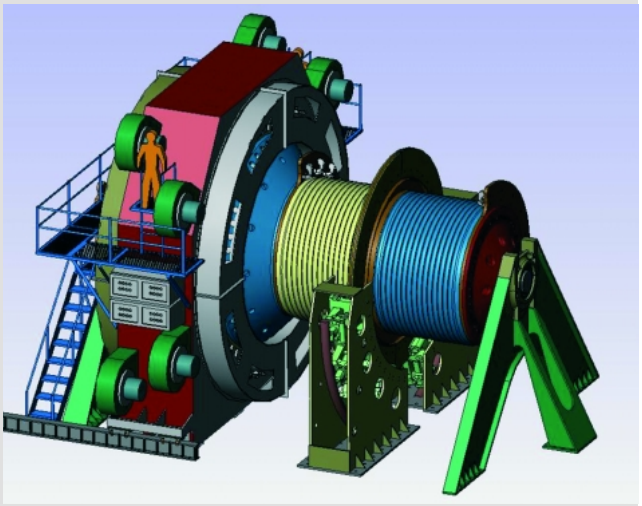
Faster bucket filling times, higher hoisting and lowering speeds and faster payout reduce machine cycle time and increase productivity. The maximum achievable improvement is a function of the specific dragline configuration and its utilization in the mine plan. Analysis of several existing dragline operations has identified significant productivity increases, well in excess of 20%.

Higher efficiency

The gearless drives eliminate the M-G set with motors and generators, and the mechanical gears. This increases the system efficiency by approximately 20% and lowers the energy cost by the same amount. Higher efficiency has been one of the major reasons why practically all other industries have already switched from M-G sets to static drives.

Less maintenance

Normal maintenance of Hoist and Drag rotating equipment and gears on a large dragline can cost more than 1 Million Dollars per year. Without DC motors, and generators, and without mechanical



gears, and related lubrication systems, all these maintenance costs and associated downtime costs are eliminated.

Lower life cycle operating costs

Lower energy costs and much lower maintenance costs together with higher uptime and higher productivity translate into lower operating costs over the life cycle of the machine and the lowest cost per ton of material moved of any excavator.

Seamless integration of SIMINE^{CIS} SIRAS and SIMINE^{CIS} MIDAS

To achieve high uptime and short MTTR (Mean Time To Repair) we offer the the most advanced and user friendly maintenance computer in the industry. It shows the electrician where the problem is, and which part is needed to fix it.

The dragline system also seamlessly integrates with SIMINE^{CIS} SIRAS and SIMINE^{CIS} MIDAS.

SIMINE^{CIS} SIRAS remote diagnostics uses Internet technology to “keep the factory on the machine”. Siemens service technicians and other experts can log on from around the world and can do the same work as the electrician on board of the dragline with the exception of tightening a screw.

SIMINE^{CIS} MIDAS harvests a wealth of data during normal operation and makes it available for productivity analysis and optimization.

SIMINE^{CIS} – Completely Integrated Solutions for the Mining Industry

As a comprehensive industry-specific solution for the mining industry, our SIMINE^{CIS} product family integrates all the products and services you need for sustained maximization of your plant’s performance.

For each particular task, a solution has been defined that

- **horizontally** improves all production processes – from excavation to benefication
- **vertically** integrates the company’s information flow end-to-end, helping corporate management to make better-founded decisions
- and **chronologically** enables optimized maintenance and comes with assured further development over the whole life cycle of your plant.

Due to this unique combination of horizontal, vertical and life cycle dimensions, our solutions all carry the genes of an exhaustive and sustained plant productivity in their very core.

For more productivity. More performance. More power. Completely Integrated Solutions from Siemens.

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