Our solution:
A custom-tailored modernization solution includes much more than simply some new electrical components. It is also important to analyze how many days of shutdown, intermittently and in total, can be foreseen for the modernization work. In other words: The production time loss has to be kept as low as possible. The perfect solution for your individual modernization scenario will be the optimum determination considering the investment costs of the new equipment, expected performance increases, minimum duration of the cutover (equaling reduced loss of production), and evaluation of all associated risks.

With decades of experience in drive, mining, and automation, Siemens is able to offer you a tailored modernization concept based on a highly standardized and proven modular approach.

Good reasons for mill drive modernization:
Siemens has been successfully implementing modernizations of selected equipment or complete systems for many years. However, the introduction of the SINAMICS SL150 drive control system for cycloconverters triggered an extensive engineering development with the specific aim of evaluating the complete electrical components of the older systems, defining adequate substitute solutions, and developing alternative modernization concepts.

The result of this development is a variety of innovative solutions, based on standard modules, to modernize the existing mill drive to a state-of-the-art system to prepare it for many further years of continuous and reliable operation.

Our experience clearly shows how worthwhile it is to spend sufficient time and resources on the very beginning to evaluate all possible alternatives and find the best possible technical solution for each application to fit the customer's requirements.

Meanwhile, in the last few years we have modernized more than 10 systems to the latest automation and drive technology, giving Siemens plenty of experience in the field and the capability to further develop and improve our modernization concepts.

Considering the importance of the cutover work and the potential cost of the related production losses, it becomes clear that the implementation of the work during the cutover must be as important as the right technical concept itself. Excellent and meticulous planning and preparation, a highly motivated can-do project team, and a trusting and cooperative relationship with our customer are indispensable factors for a successful modernization project.

The broad range of Siemens modernization solutions is tailor-made to cover the replacement of aging equipment from a single component level right up to partial and complete systems. Furthermore, our customers can benefit from adding new and enhanced features not previously implemented on the running system as well as increasing the overall performance or even the capacity of their mill drive system.

Your benefits:
- Directly benefit from the latest developments in automation and drive technology.
- Enhance the longevity of your mill drive while keeping the levels of high productivity, reliability, and availability you use to.
- Increase your plant availability through improved troubleshoot and diagnostic possibilities as well as personnel training.
- Minimize impact, cost, and risk of the modernization work on operations through optimized and standardized packages in combination with other routine work at the mill.
- Improve the overall serviceability.

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Modernization of mill drive systems in minerals

Answers for industry.
Maintaining reliability and availability despite aging mill drive components

Customer: PT Freeport, Grasberg, Papua, Indonesia

The challenge:
Many Siemens systems have been in operation for decades. While motors easily achieve their lifetime, the situation with electronic controls can be different: Rapid advances in control technology during their service lives can make older equipment difficult to maintain and upgrade. It is important to ensure that the availability of the grinding mill is not affected by unreliable control systems.

Solution:
For this project Siemens was dedicated to identifying and implementing measures that from the point of view of the component cost may not have been the cheapest compared to alternatives but which significantly reduced installation time, commissioning time, and associated risks during the outage. At new components were procured and commissioned in the Siemens test facility in Erlangen, Germany, to ensure a smooth, trouble-free transition. In addition, the major preparation work was done in the customer’s control center during previously planned and regular maintenance shutdowns.

For long-term operation of your mine, the only comprehensive solution to the challenges of aging devices is the stepwise modernization of the old control systems. Of course there is no single modernization concept or one-size-fits-all. Rather, for each individual customer and each specific installed system, the most suitable modernization solution has to be determined based on the customer's prioritized criteria. The individual customer and each specific installed system, the most suitable modernization solution has to be determined based on the customer's prioritized criteria.

Order:
- A modernization concept for a gearless mill drive that retains most of the existing electrical equipment
- PLC system upgrade from SIMATIC S5 to SIMATIC S7
- Specially manufactured I/O adapters from S5 to S7
- Upgrade of HMI from COROS LS-B to SIMATIC PCS7
- SIMANICS SL150 closed-loop control as a replacement for the old SIMAPIN D
- New control cubicle in the existing E-House
- New development of I/O loops concept interface board connected to the existing water-cooled power section
- Exchange of the old SIMOVERT D converter for excitation with a completely new SINAMICS DCM (6RA80) slip ring cubicle
- Realization of wiring power cables, transformers, isolators, MCCs, and all auxiliary equipment

Installation of new container (E-House) in parallel to the existing system removed after final cutover (in red)

Order:
- Modernization of a mill section AC synchronous drive system using a parallel setup approach to minimize downtime during outage

Solution:
- Replacement of the complete converter system with the new SINAMICS SL150 cycloconverter in our tested version — with the SIMANICS SL150 connected to the existing power stack tower in a modular configuration.
- Exchange of the old SIMOVERT D converter for excitation with a completely new SINAMICS DCM (6RA80) slip ring cubicle
- New control cubicle in the existing E-House
- New V90 drive connection with new SIMAPIN D for excitation with a completely new SINAMICS DCM (6RA80) slip ring cubicle
- Reutilization of existing I/O marshaling racks, motors including auxiliaries, and transformers

Building of a new E-House on a platform attached to the outside wall of the grinding building along with an opening through the wall to allow direct access from the mill platform
- Installation of new E-House platform attached to the outside wall of the grinding building along with an opening through the wall to allow direct access from the mill platform
- Installation of new E-House platform attached to the outside wall of the grinding building along with an opening through the wall to allow direct access from the mill platform
- Installation of new V90 drive connection with new SIMAPIN D for excitation with a completely new SINAMICS DCM (6RA80) slip ring cubicle
- Retrofit of new V90 drive connection with new SIMAPIN D for excitation with a completely new SINAMICS DCM (6RA80) slip ring cubicle
Maintaining reliability and availability despite aging mill drive components

The challenge:

Many Siemens Mill Drives (SIMADYN D) have been in operation for decades. The challenge is not only to keep the entire system running without interruption, but also to modernize it without causing even an hour of production stoppage. A major number of testing procedures could be completed prior to the main cutover of the plant. During previously planned and regular maintenance shutdowns, the customer temporarily switched over the main cutover. But our understanding of “minimal downtime” didn’t stop there: The newly installed equipment inside the grinding building in parallel to the existing I/O boards that obviated the need for rewiring any I/O isolators, MCCs, and all auxiliary E-House equipment. As the connection of the existing I/O modules in the existing E-Room paved the way for minimal downtime during the main cutover. The higher initial investment paid off handsomely during the installation and commissioning phase. The equipment inside the new E-House could be fully tested in advance in the manufacturing facility. In addition, all installation activities were performed without causing even an hour of production stoppage.

Solution:

- PLC system upgrade from SIMATIC S5 to SIMATIC S7
- Specially manufactured I/O adapters from S5 to S7 (I/O boards that obviated the need for rewiring any I/O isolators, MCCs, and all auxiliary E-House equipment)
- Exchange of the old SIMOVERT D converter for excitation with a completely new SINAMICS DCM (6RA80) version – with the SINAMICS SL150 preassembled in air-cooled cubicle
- A modernization concept for a gearless mill drive that retains most of the existing electrical equipment

Customer: PT Freeport, Grasberg, Papua, Indonesia

Order: PLC system upgrade from SIMATIC S5 to SIMATIC S7

Solution:

- Specially manufactured I/O adapters from S5 to S7 (I/O boards that obviated the need for rewiring any I/O isolators, MCCs, and all auxiliary E-House equipment)
- Exchange of the old SIMOVERT D converter for excitation with a completely new SINAMICS DCM (6RA80) version – with the SINAMICS SL150 preassembled in air-cooled cubicle
- A modernization concept for a gearless mill drive that retains most of the existing electrical equipment

Customer: Robinson Copper Mine, Nevada, USA

Order: PLC system upgrade from SIMATIC S5 to SIMATIC S7

Solution:

- Specially manufactured I/O adapters from S5 to S7 (I/O boards that obviated the need for rewiring any I/O isolators, MCCs, and all auxiliary E-House equipment)
- Exchange of the old SIMOVERT D converter for excitation with a completely new SINAMICS DCM (6RA80) version – with the SINAMICS SL150 preassembled in air-cooled cubicle
- A modernization concept for a gearless mill drive that retains most of the existing electrical equipment

Customer: KGHM International Ltd., Grasberg, Papua, Indonesia

Order: PLC system upgrade from SIMATIC S5 to SIMATIC S7

Solution:

- Specially manufactured I/O adapters from S5 to S7 (I/O boards that obviated the need for rewiring any I/O isolators, MCCs, and all auxiliary E-House equipment)
- Exchange of the old SIMOVERT D converter for excitation with a completely new SINAMICS DCM (6RA80) version – with the SINAMICS SL150 preassembled in air-cooled cubicle
- A modernization concept for a gearless mill drive that retains most of the existing electrical equipment
Maintaining reliability and availability despite aging mill drive components

The challenge:

Many Siemens Mill Drives have been in operation over decades. While motors easily achieve this lifetime, the situation with electronic controls can be different: Rapid advancements in electronics and computer technologies have allowed significant progress in the control technology of mill drive systems. Nearly all electronic systems used within the overall drive control – power distribution, power network protection, automation (PLC), visualization (HMI), closed-loop drive control for stator and excitation circuits, field sensors etc. – can be affected by obsolescence due to the technology of aging processes.

The modernization process should have as little impact as possible on the running mine operation, with each hour of downtime resulting in a potentially heavy production loss. The challenge: to develop a site-specific solution that guarantees the reliability of the mine’s production. This requires the availability of a highly trained project team before executing any site works.

Order:

A modernization concept for a gearless mill drive that retains most of the existing electrical equipment.

Solution:

- PLC system upgrade from SIMATIC S5 to SIMATIC S7
- Specially manufactured I/O adapters from S5 to S7 (DC0 boards that obviate the need for rewiring any I/O)
- Upgrade of VME from CODES LS 4 to SIMATIC IPC7
- SIMANICS S150 closed-loop control as a replacement for the old SIMAPL
- New control cubicle in the existing E-House
- New developed closed-loop control interface board connected to the existing water-cooled power section
- Exchange of the old SIMAPR D converter for excitation with a completely new SIMANICS DCM (SINAMICS) cubicle
- Realization of wiring power cables, transformers, isolators, MCCs, and all auxiliary E-House equipment
- Installation of new container (E-House) in parallel to the existing system removed after final cutover
- Building of a new E-House on a platform attached to the outside wall of the grinding building along with a connecting of the existing I/O modules in the existing E-House
- Installation of new I/O adapters fixed at existing power stack tower
- Installation of new container (E-House) inside of the grinding building
- Installation of new control cubicle connected to the existing water-cooled power section
- Replacement of the complete converter system with a new SINAMICS S150 converter in a co-rated version – with the SIMANICS S150 presented in a container module (E-House) together with the new SIMANICS DCM for the excitation circuit and a new air-cooling and circulating system
- Installation of new PLC CPU in a new E-House as well as the commissioning of the existing I/O modules in the existing E-House
- Replacement of all I/O adapters including auxiliaries, and transformers

Customer: PT Freeport, Gresberg, Papua, Indonesia

Order:

Modernization of a hilly project AC synchronous drive system using a parallel setup approach to minimize downtime during cutover.

Solution:

- Installation of the complete converter system with the new SINAMICS S150 converter in the co-rated version – with the SIMANICS S150 presented in a container module (E-House) together with the new SIMANICS DCM for the excitation circuit and a new air-cooling and circulating system
- Installation of new PLC CPU in a new E-House as well as the commissioning of the existing I/O modules in the existing E-House
- Building of a new E-House on a platform attached to the outside wall of the grinding building along with an opening through the wall to allow direct access from the mill platform
- Realization of existing I/O manipulating rails, motors including auxiliaries, and transformers

Customer: KGHM International Ltd., Robinson Copper Mine, Nevada, USA

Order:

Modernization of a mine using a gearless mill drive system using a parallel setup approach to minimize downtime during cutover.

Solution:

- Replacement of the complete converter system with the new SINAMICS S150 converter in the co-rated version – with the SIMANICS S150 presented in a container module (E-House) together with the new SIMANICS DCM for the excitation circuit and a new air-cooling and circulating system
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- Realization of existing I/O manipulating rails, motors including auxiliaries, and transformers

Customer: KGHM International Ltd., Robinson Copper Mine, Nevada, USA

Order:

Modernization of a hilly project AC synchronous drive system using a parallel setup approach to minimize downtime during cutover.

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Our solution:
A custom-tailored modernization solution includes much more than simply some new electrical components. It is also important to analyze how many days of shutdown, intermittently and in total, can be foreseen for the modernization work. Or in other words: The production time loss has to be kept as low as possible. The perfect solution for your individual modernization scenario will be the optimum determination considering the investment costs of the new equipment, expected performance increase, minimum duration of the cutover (equaling reduced loss of production), and evaluation of all associated risks.

Good reasons for mill drive modernization:
Siemens has been successfully implementing modernizations of selected equipment at installed systems for many years. However, the introduction of the SINAMICS SL150 drive control system for cycloconverters triggered an extensive engineering development with the specific aim of evaluating the complete electrical components of the older systems, defining adequate substitute solutions, and developing alternative modernization concepts.

The result of this development is a variety of innovative approaches, based on standard modules, to modernize the existing mill drive to a state-of-the-art system to prepare it for many further years of continuous and reliable operation.

Our experience clearly shows how worthwhile it is to spend sufficient time and resources on the very beginning to evaluate all possible alternatives and find the best possible technical solution for each application to fit the customer’s requirements.

Meanwhile, in the last few years we have modernized more than 10 systems to the latest automation and drive technology, giving Siemens plenty of experience in the field and the capability to further develop and improve our modernization concepts.

Considering the importance of the cutover work and the potential cost of the related production losses, it becomes clear that the implementation of the work during the cutover is just as important as the right technical concept itself. Excellent and meticulous planning and preparation, a highly motivated can-do project team, and a trusting and cooperative relationship with our customer are indispensable factors for a successful modernization project.

The broad range of Siemens modernization solutions is tailor made to cover the replacement of ageing equipment from a single component level right up to partial and complete systems. Furthermore our customers can benefit from adding new and enhanced features not previously implemented on the running system as well as increasing the overall performance or even the capacity of their mill drive systems.

Your benefits:
- Directly benefit from the latest developments in automation and drive technology.
- Enhance the longevity of your mill drive while keeping the levels of high productivity, reliability, and availability you used to.
- Increase your plant availability through improved troubleshooting and diagnostic possibilities as well as personnel training.
- Minimize impact, costs, and risk of the modernization work on operations through optimized and standardized packages in combination with other routine work at the mill.
- Improve the overall serviceability.

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Our solution:
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Good reasons for mill drive modernization:
Siemens has been successfully implementing modernizations of selected equipment at installed systems for many years. However, the introduction of the SINAMICS SL150 drive control system for cycloconverters triggered an extensive engineering development with the specific aim of evaluating the complete electrical components of the older systems, defining adequate substitute solutions, and developing a different alternative modernization concept. The result of this development is a variety of innovative approaches, based on standard modules, to modernize the existing mill drive to a state-of-the-art system to prepare it for many further years of continuous and reliable operation.

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- Minimize impact, costs, and risk of the modernization work on operations through optimized and standardized packages in combination with other routine work at the mill.
- Improve the overall serviceability.

More reasons:
- Safety and efficiency of your mill drive process are guaranteed.
- With decades of experience in drives, mining, and automation, Siemens offers a tailor-made modernization solution that fits your needs.
- Our service concept includes the supply of standardized packages and additional services.