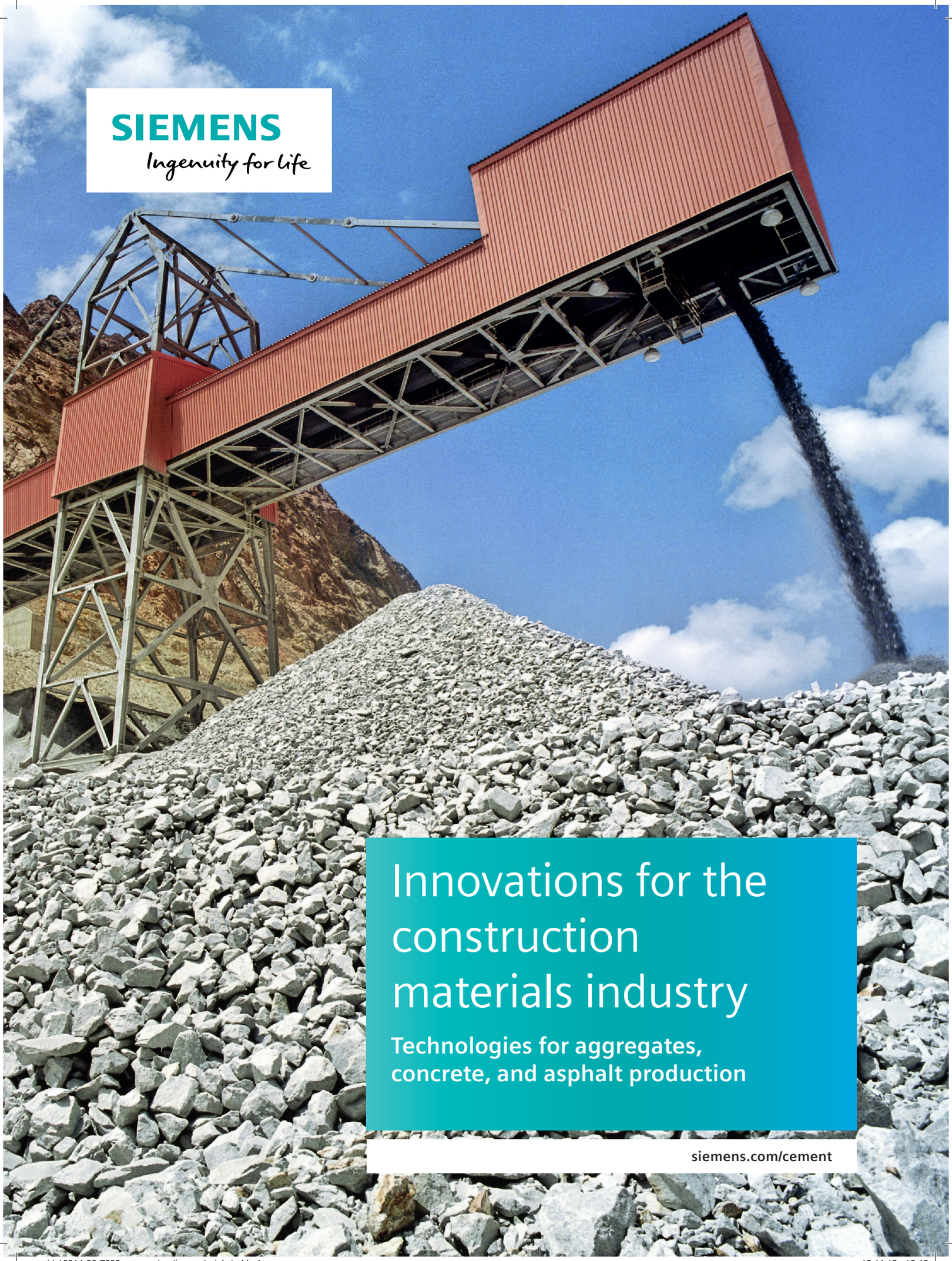


Efficiency is success – rising demands for the construction materials industry

Your challenge

Market demand for construction materials is fluctuating with the state of the economy. Energy prices are steadily intensifying their pressure on the cost base. Environmental concerns are increasing and regulations are becoming harsher. Customers are posing stricter quality requirements. Today the construction materials industry faces a host of challenges.

Our solution

Siemens is the right partner for you to handle those challenges. With our broad portfolio, we can support you in

- improving your operations, and so saving operating and capital costs as well as energy
- ensuring higher availability and therefore higher plant productivity
- lowering costs and extending the life of your equipment
- delivering the highest product quality and top service to your customers
- gaining a competitive edge in the marketplace.

Benefits

Industry expertise
We understand your business and your technological challenges and we are ready to work with you to solve your most pertinent problems.

Global presence
We offer support and delivery to any corner of the world to improve your global growth. If necessary, specialists can be at your location within hours.

One-stop shopping
Fulfilling all your needs for electrical components from a single source saves engineering and maintenance costs throughout the lifecycle of your plant and ensures a seamless integration.

Technological leadership and innovation
When you partner with Siemens, you partner with a trendsetter, and you will always have the latest technological advancements available.

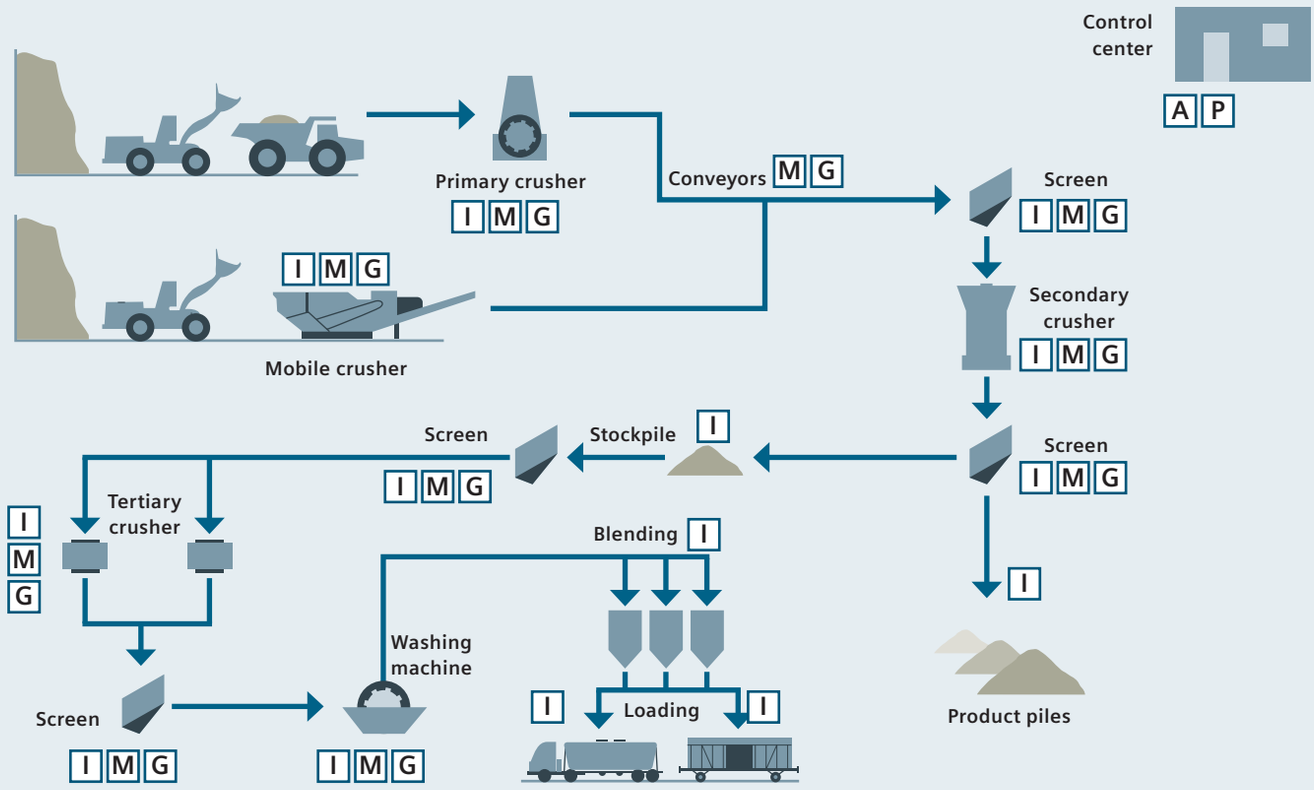
Contents

From blasting to stockpile – solutions for the aggregates production process

Quarries are one of the most arduous application areas for any industrial product. Temperature extremes, dust, wind, rain, snow, and sun – they have it all. In this environment, you need equipment you can rely on.

Siemens supports your needs in the production of aggregates – from power generation and distribution to plant automation and drives. Our products are perfectly suited for the harsh environments of the quarry, and they also set the benchmark for energy efficiency. Siemens automation ensures the optimal operation of your crushing plant and a consistently high product quality.

Aggregates production process and Siemens Portfolio



A **Automation**
- Minerals Bundle based on SIMATIC PCS 7
- TIA Portal, WinCC, WinCC flexible
- SIMATIC PLC, Distributed I/O, HMI Panels, Industrial PCs
- SCALANCE Ethernet switches
- SIPLUS extreme products

I **Process instrumentation**
- SITRANS L level measurement
- SIWAREX and Milltronics weighing technologies (static, dynamic)
- SITRANS P/T pressure and temperature measurement
- SITRANS F flow measurement

P **Power and motor control**
- SIRIUS components for switching, starting and protecting
- SIMOCODE pro Motor Management System
- SENTRON power supply and measuring
- SIVACON power distribution boards and MCC

M **Motors and drives**
- SIMOTICS low-voltage AC motors
- SINAMICS and ROBICON Perfect Harmony frequency converters
- SIRIUS soft starters, direct starters
- SIPLUS CMS Condition Monitoring System

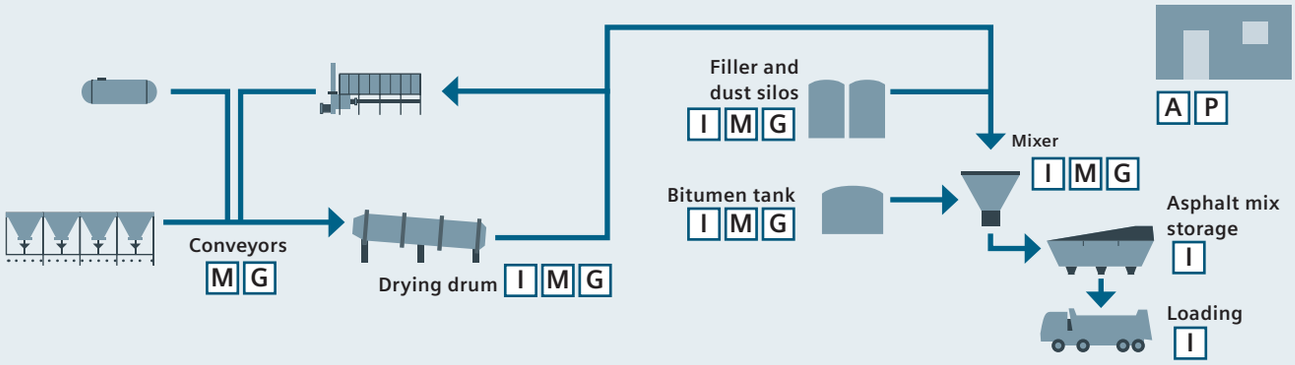
G **Gear units, geared motors and couplings**
- FLENDER gear units
- FLENDER couplings
- SIMOGEAR geared motors

Just the right mix – solutions for the ready-mix concrete and asphalt process

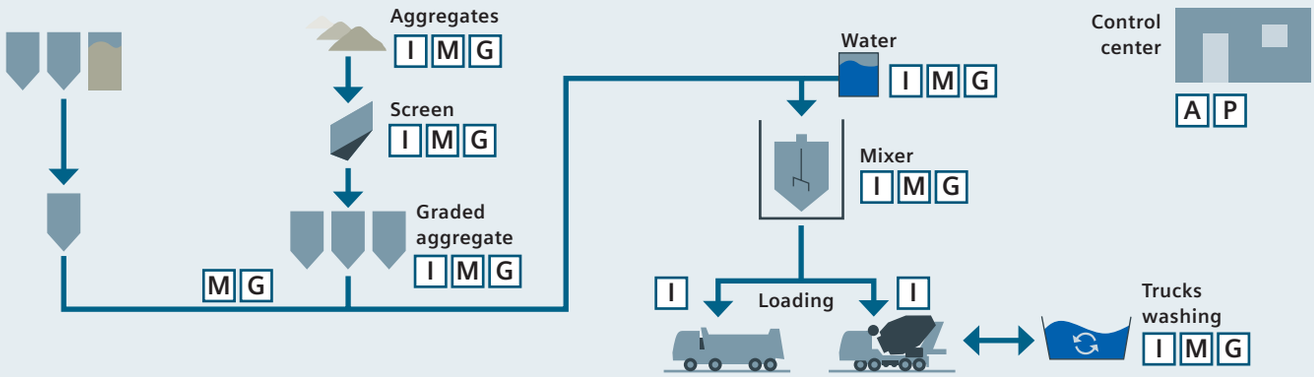
Reliable customer service and on-time delivery are crucial for perishable products like ready-mix concrete and asphalt. That's why plant operators have to be able to rely on their technical equipment.

When partnering with Siemens, RMC and asphalt plant operators can rely on their systems and so can concentrate solely on serving their customers. Automation from Siemens has set the standard for the industry in many countries and at multiple global customers because it ensures the highest process transparency and availability.

Ready-mix concrete production process and Siemens portfolio



Asphalt production process and Siemens portfolio



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SIMATIC PLCs

Distributed I/O SIMATIC ET 200SP and ET 200MP

Increasing productivity – process automation and control system solutions

Automation in the construction materials industry not only helps you keep cost down, but also ensures the highest availability of your equipment and a consistently high product quality.

SIMATIC PLC and distributed I/O

SIMATIC controllers and distributed I/O systems offer integrated functionality and numerous options for performance scaling.

SIMATIC embedded automation

In the demanding environment in your quarry or mixing plant, SIMATIC PCs offer everything you need: modern industrial design, compliance with industry standards, and high system availability while also withstanding loads that include vibration, cold, dust, and heat.

SIMATIC HMI

To help you maintain an overview of your production processes and equipment, Siemens offers a broad selection of tools – from operator panels and WinCC visualization software for the control and monitoring of your machines to comprehensive SCADA systems that manage almost any process visualization requirement in your plant.

SIMATIC NET industrial communication

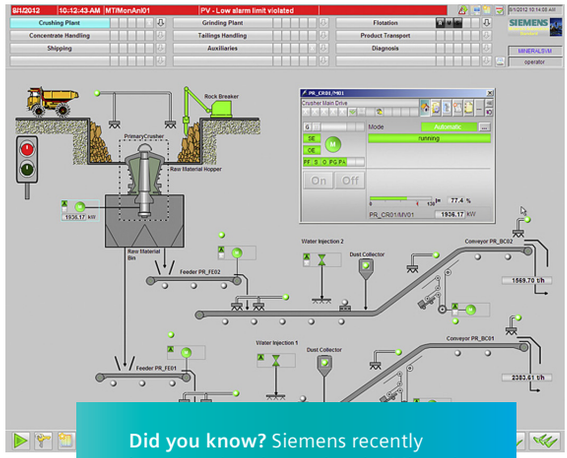
High efficiency in your plant can only be achieved through open, transparent commu-nication across all levels. Siemens offers innovative technology based on proven standards – ranging from AS-Interface, Profibus, and HART interfacing to Industrial Ethernet with integrated IT technology.

SIPLUS extreme

Humidity, short-lived condensation, vibration, icing and temperatures from –40 to +70° Celsius matter little to our SIPLUS extreme version of the SIMATIC components, making them particularly suitable for use under adverse conditions such as those found in the humid vicinity of mixer and weighing platforms.

SIPLUS CMS

SIPLUS CMS offers efficient condition monitoring for the early detection of mechanical machine damages.



Did you know? Siemens recently introduced to the market the Minerals Bundle for the construction materials industry based on the leading process control system for cement CEMAT/ SIMATIC PCS 7 and S7-410 Entry PLC.

In the construction materials industry Siemens offers you solutions for any automation philosophy – the lightweight SCADA/PLC for easy and flexible process visualization or the leading DCS system SIMATIC PCS 7 for scalable operations and customers with multiple production sites.

Process control system: Gain a competitive edge

Today reliable processes are crucial for succeeding in the construction materials industry. To stay competitive, your plant must function smoothly and efficiently at all times, delivering the best possible ROI at the lowest possible cost. With process control software based on S7-410E, Siemens offers a highly innovative distributed control system that guarantees your competitiveness and opens the door to the Internet of Things or brings digitalization to your plant over time – by optimizing productivity, plant availability, and energy efficiency.

The process control system based on S7-410E is the right tool for you to easily control, monitor, and visualize the ongoing operations in your plant – from crushing through material handling and loading. To increase your plant availability and productivity, the system helps you immediately diagnose system errors directly from the control room, which saves you time spent in resolving them.

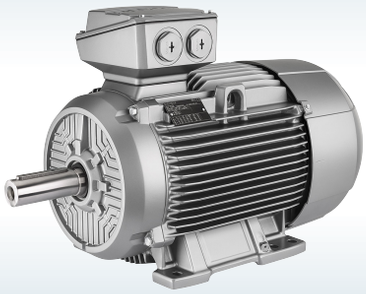
SIMATIC TIA Portal: Your gateway to automation in the Digital Enterprise

The TIA Portal lets you integrate all the key components in your automation project: control, HMI & SCADA WinCC and WinCC OA, drives, decentralized peripherals, motor management, and now also motion control and power distribution.

It provides you with unrestricted access to our complete range of digitalized automation services, from digital planning and integrated engineering to transparent operation.

The TIA Portal shortens the time to market, for example by means of simulation tools, increases the productivity through additional diagnostics and energy management functions, and offers broader flexibility by connecting to the management level. These options benefit system integrators and machine builders as well as plant operators.

SIMOTICS low-voltage motor



Customized performance – Siemens motors and drive systems

Only the right drive technology ensures the reliability and performance required in the construction materials industry. With its unmatched portfolio of motors, drives, gear units, and couplings, Siemens meets your needs in the most reliable and energy-efficient way.

SIMOTICS low-voltage motors: Unbeatable in cost-effectiveness and engineering excellence

The construction materials industry has its own specific requirements when it comes to drive technology. Complementing our standard range of general-purpose and severe-duty motors, we also offer specific motors that fully comply with special sector requirements. This allows us to provide solutions that perfectly match our customers' demands.

SIMOTICS SD Severe Duty motors

Our SD motors with gray cast-iron frames are especially rugged. This makes them the first choice for applications in the toughest of environmental conditions, where they easily master dust and vibration in crushers and mixers.

SIMOTICS N-compact and SIMOTICS FD

Siemens N-compact motors offer you more power and higher cost-effectiveness combined with outstanding reliability. The power rating of these motors above DIN 42673 is extremely progressive and lies significantly above the power rating of the previous series – with unchanged frame size. SIMOTICS FD motors are designed and optimized for VSD operation in various cooling concepts.

Benefits

Especially user-friendly

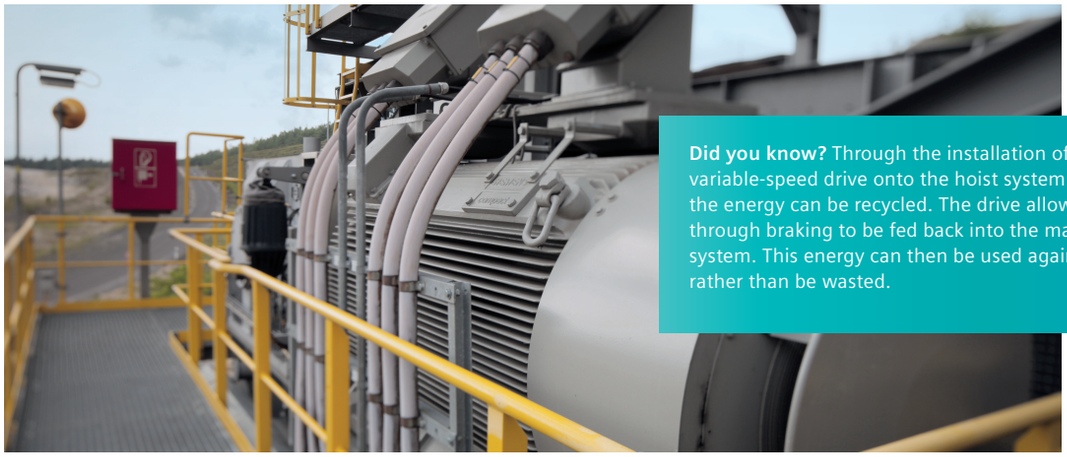
User-friendly terminal boxes preconfigured with a terminal board that can be rotated through 360 degrees make installation simpler and easier even in narrow spaces – which saves you money.

More power in smaller sizes

Our motors offer unbeatable envelope dimensions and weight at any power rating. For example, in high-efficiency class (IE2 and IE3), the power ratings of a standard motor can be realized in the next smaller shaft height.

Energy-saving motors

Our energy-saving motors require less energy for the same power output. Using SinaSave software, you can easily calculate their savings and the payback time of your investment.



Did you know? Through the installation of a regenerative variable-speed drive onto the hoist system or a downhill conveyor, the energy can be recycled. The drive allows the energy created through braking to be fed back into the main energy supply system. This energy can then be used again to power the hoist, rather than be wasted.

SINAMICS frequency converters: Impressive in every respect

To meet the varying requirements of our customers, we offer a wide range of drives suitable for any application in the construction materials industry. For the most common applications such as conveyors, pumps, and fans, the SINAMICS G product family provides an impressive technological functionality.

SINAMICS S high-performance converters are designed for more sophisticated applications – drive tasks where several motors work together or where energy regeneration opportunities exist. For medium-voltage applications, Siemens provides the SINAMICS GM150 and ROBICON series.

SIRIUS soft starters: Outstanding functionality in compact design

With SIRIUS, we offer you a unique comprehensive portfolio for every industrial control application. The major advantages: With their modular design, our products can be planned and built into a control cabinet in a very simple way. They are especially easy to integrate into distributed systems. Using SIRIUS soft starters in a cascade operation, you can achieve the best, most energy-efficient solution for the motor application for fixed speed, variable speed, or a combination of both in each case.

SIPLUS CMS: Transparency of mechanical variables across all levels

To support predictive maintenance, SIPLUS CMS records and analyzes mechanical variables from machines, integrates them into the automation world, and provides decision making aids to maintenance staff, operators, and management. With CMS1200, mechanical condition data from the production can be directly integrated into the data stream via a controller.

Benefits

Optimal process control and substantial energy savings

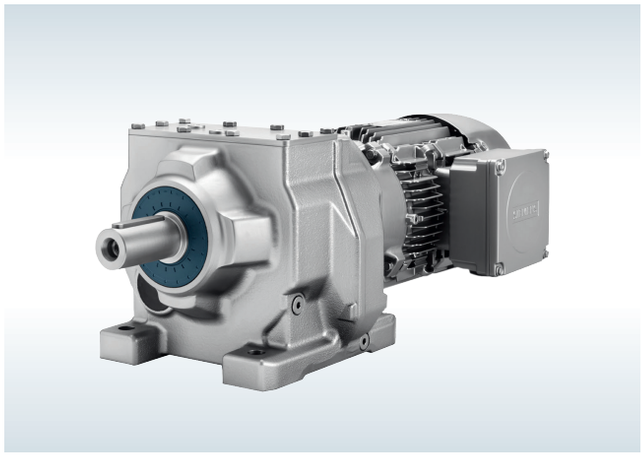
Using Siemens drives, you save up to 70 percent energy in pumps, fans, and even mixers, while consuming only what your applications demand at any given moment. In addition, their accurate parameter control contributes to more consistent quality and throughput.

Reduced maintenance cost

Siemens drives also lower maintenance costs and downtime, and ensure longer equipment life by minimizing mechanical damage when starting and controlling your plant's equipment – from crushers and feeders to conveyors and mixers.

Easy to install and commission

Engineering and parameterization of Siemens drives is made easy using the proprietary SIZER and STARTER tools and the intuitive basic operator panel (BOP). Users benefit from a standardized and user-friendly operating concept that minimizes training and service requirements.



Power under control – Siemens mechanical drives and geared motors

More flexibility, more power – the expectations of the construction materials industry toward the drives technologies employed are rising, especially when conveying or mixing aggregate.

SIMOGEAR: The new standard for geared motors

With the added benefits of a higher gear unit torque than normally found on the market, Siemens SIMOGEAR geared motors deliver performance ranges up to 200 kW and can achieve a gear unit torque up to 19,500 Nm. Standstills of your mixers and conveyors remain a thing of the past.

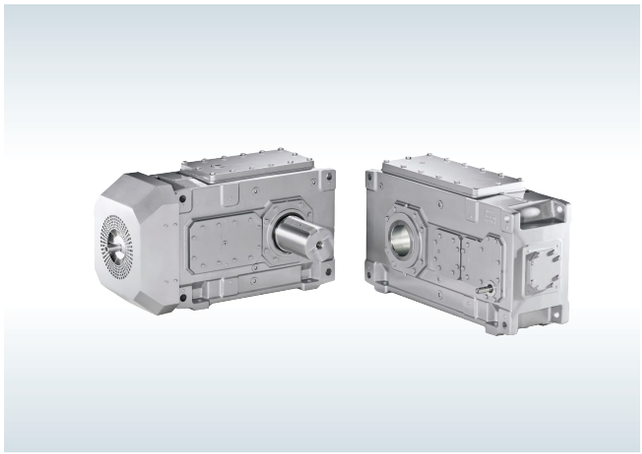
SIMOGEAR geared motors are 1:1 compatible with the general standard in the market. This means that you can completely modernize or reconfigure your complete drive solution at any time – with low associated cost.

Benefits

High-rated gear unit torques
With our new SIMOGEAR series, you profit from higher-rated torques with the same gear unit size as geared motors from our competitors. You also achieve a better operating factor and therefore higher plant availability and operational reliability.

High gear unit ratio
As a result of our special mechanical design, in many applications one gear stage can be eliminated. You also enjoy more cost advantages if you can use standard four-pole motors instead of six- or eight-pole motors.

High degree of flexibility
Our SIMOGEAR modular system allows you to configure all of the versions of geared motors generally found on the market. When using mounting shaft functional units like brakes, separately driven fans and encoders can be installed. The basic motor always remains the same so that functional units can be added even after the motor has been installed.



Did you know? Mechanical drives are as important as electrical components when considering energy efficiency. For example, exchanging your old worm gear unit with a helical one might boost the efficiency of this component from 50 percent to up to 98 percent.

Gear units and clutches take the hardest hits as they try to protect your motors from vibration and to keep them operating at maximum efficiency. When this requirement is fulfilled, high plant availability and low product lifecycle costs are practically guaranteed.

FLENDER gear units and coupling: The universal solution for power transmission

With FLENDER, Siemens offers you the widest industrial gear unit and coupling ranges worldwide – from standard to application-related and customer-specific ones.

In the construction materials industry, gear units and couplings must be robustly designed so that they can work reliably even under extreme conditions. That is why FLENDER gear units and couplings are created to withstand cold, heat, and dust in the extreme conditions in quarries and plants.

Benefits

Unmatched portfolio for any application

Due to the modular design of the gear units and the multitude of series, sizes, and drive powers of FLENDER couplings, any customer requirement can be met – from mixers and conveyors to cranes and crushers.

High efficiency and low lifecycle costs

Due to their optimal efficiency and low power-weight ratio, our standard gear units promise high energy efficiency, and their first-class quality and proven technology ensures low lifecycle costs.

High availability

The modularity of the entire product range permits comparably short delivery times. Our products' special designs and powers and multiple application-specific add-ons have been fully standardized so that adapting a gear unit to customer requirements does not affect delivery time.

SIRIUS industrial control products

Ensured power supply – Siemens motor control and power distribution

When even a short power failure may have serious consequences, you need products and systems that can cope with every eventuality and always keep you on the safe side. Our portfolio is the broadest worldwide, covering everything from transformers, switchboards, and motor starters to socket outlets.

SIRIUS: Modular standard components for switching, starting, and protecting

The SIRIUS modular system provides you with cost-efficient solutions for low-voltage control and distribution. For soft starting and ramping down to avoid mechanical shocks or voltage dips, SIRIUS soft starters 3RW44 are the perfect solution.

The individual SIRIUS components with their compact design can be fast and easily configured, mounted and maintained. Soft starters, circuit breakers or contactors are simply screwed together and the load feeder is ready for use.

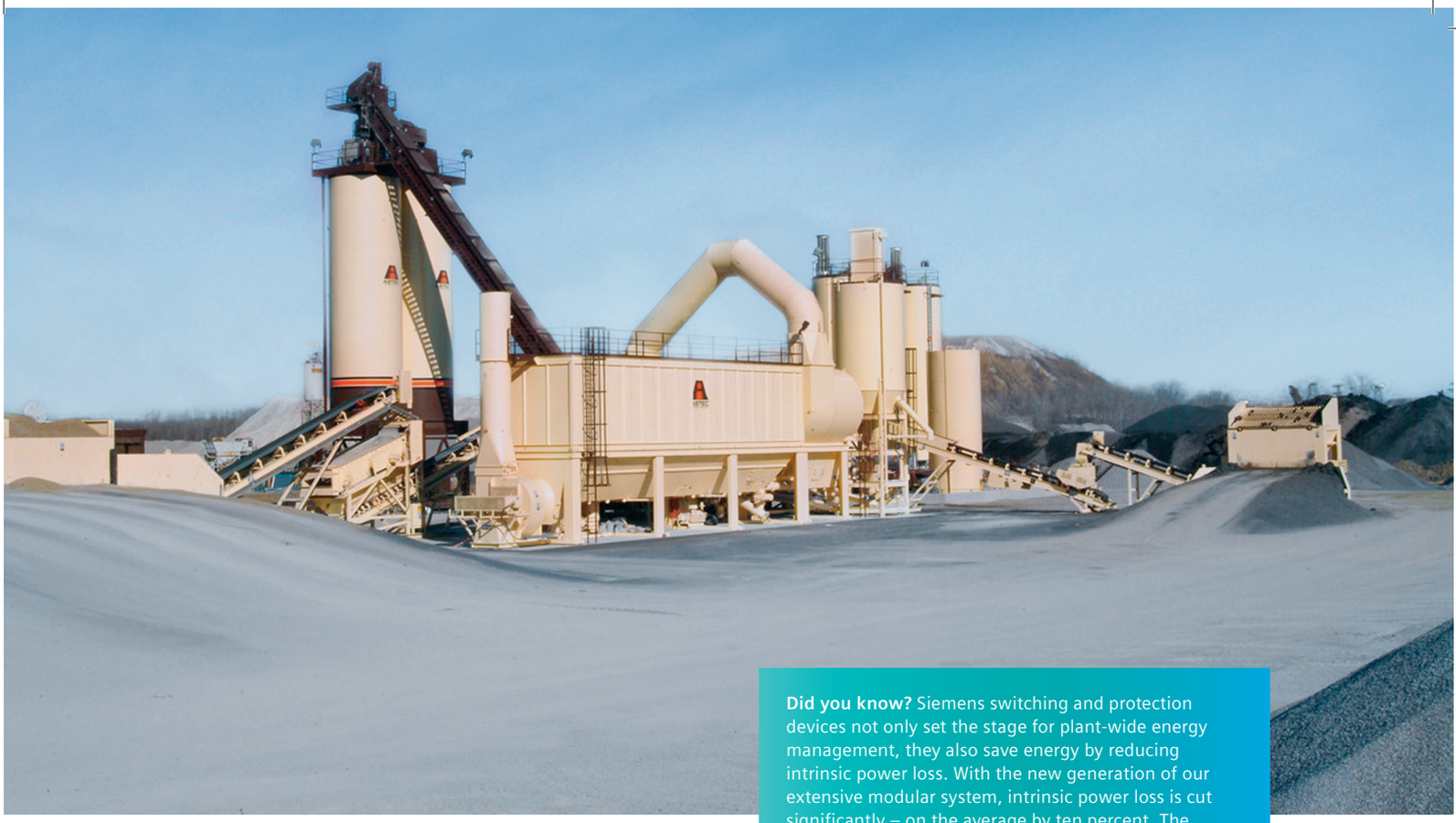
SIMOCODE pro: The flexible and modular motor control system for low-voltage motors

SIMOCODE pro combines in just one compact system all required protection, monitoring, safety, and control functions. Connected to the automation system via PROFIBUS, Modbus, PROFINET, OPC UA, and Ethernet/IP, SIMOCODE pro covers all functional requirements between the motor starter and the automation system – including the fail-safe disconnection of motors.

SIVACON: Trendsetter in power distribution boards and motor control centers

The SIVACON low-voltage power distribution boards set new standards as a power distribution board or Motor Control Center (MCC) for industrial applications or in infrastructure. The power distribution board up to 7,000 A guarantees maximum personnel as well as system safety and answers any power distribution challenge in the construction materials industry.

Using SIVACON with SIMOCODE pro, up to 40 communications-capable motor feeders can be integrated in a single control cubicle.



Did you know? Siemens switching and protection devices not only set the stage for plant-wide energy management, they also save energy by reducing intrinsic power loss. With the new generation of our extensive modular system, intrinsic power loss is cut significantly – on the average by ten percent. The results are less heat, higher packing density, and less power required in the control cabinet.

SENTRON: More efficient utilization of your energy

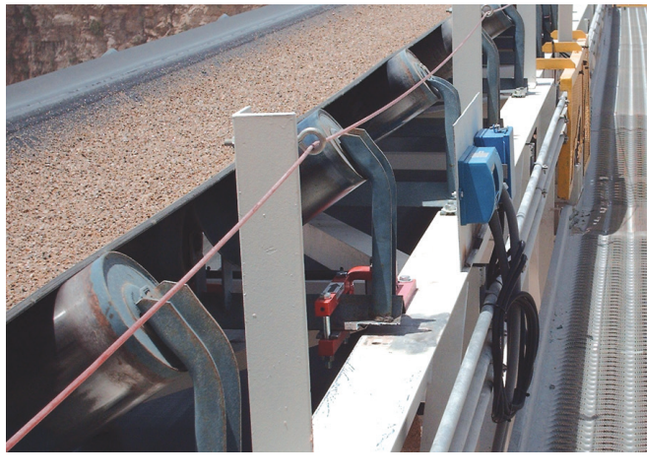
Whether in a quarry, at a construction site, or in your plant, a reliable power supply is of utmost importance – and the SENTRON family always provides you with the right device: air circuit breakers, molded-case circuit breakers (MCCB), or switch disconnectors. In addition, the PAC3200 multifunction meter reliably and precisely measures consumption data and provides the ideal basis for optimization measures.

Benefits

Easy planning, configuration, and retrofitting
Siemens components are standardized and are precisely matched with each other. Their modular design makes planning, assembly, and retrofitting for the low-voltage power distribution easy and fast.

Space-saving
Considerably reduced space requirements and up to 75 percent cost savings on wiring in your cabinets thanks to a compact design.

Convenient handling, easy expandability, and cost-saving storage
Thanks to a very limited number of models and standardized accessories, Siemens power distribution components save you on storage costs and reduce plant downtimes that result from missing parts.



Know your process – Siemens instrumentation solutions

Whether you want to weigh, measure level, flow, pressure, or temperature, we have the solution for harsh environments. This comprehensive product range puts Siemens firmly in the position of a main instrument vendor to the construction materials sector.

SITRANS L: Level measurement to meet the industry's needs

Whether you are measuring liquids, slurries, or bulk solids, Siemens provides the right level measuring technology for every application. Our best-in-class level measurement devices set the benchmark in the construction materials sector.

SITRANS F: Precise flow measurement in harsh applications

Whether a standard pulsed DC flow meter for process liquids, a high-performance AC pulsed flow meter for slurries, or a precision mass flow meter for dosing, the SITRANS F product line covers a broad range of flow rate management requirements.

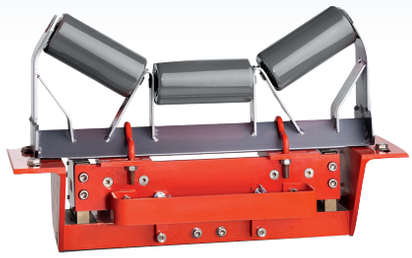
SITRANS P: Pressure measurement without compromise

Siemens pressure transmitter products offer maximum precision, robustness, and ease of use. The series covers basic level-proportional hydrostatic pressure through digital pressure transmitters for measuring gauge pressure, absolute pressure, differential pressure, flow, and level.

SITRANS T: Robust and reliable temperature sensing

Whatever you are looking for in a temperature transmitter, Siemens temperature measurement devices offer you a solution. They are designed to support all common RTDs, thermocouples, resistance, and millivolt sensors. The range covers head, rail, and field transmitters and includes industry-specific sensors for all common applications.

Milltronics MSI, SITRANS LR560,
SITRANS FM TRANSMAG 2



Did you know? SITRANS LR560 is the first radar level transmitter ever to operate at a frequency of 78 GHz, producing a beam angle of just four degrees. beam angle of just four degrees. The advantage: LR560 provides the ability to measure up to 100 m range on any solids application while minimizing the effects of stand pipes and obstructions, significantly reducing the costs of installation and commissioning.

SIWAREX and Milltronics: Optimal solution for static and dynamic weighing

Simplicity and reliability define Siemens weighing products. First-class solutions help you master conveyor belt weighing, static weighing, and loss-in-weight applications with ease. Our SIWAREX PLC-based weighing electronics allow direct integration into the Siemens range of PLCs, providing unparalleled flexibility and ease of use. In the construction materials industry, our weighing technology makes a decisive contribution toward meeting quality, cost, and deadline targets.

Benefits

Rugged design

Siemens process instrumentation products are designed to withstand the harsh conditions of the construction materials industry. From the dust-laden atmosphere found in quarries and cement silos to the high temperatures in bitumen tanks and the abrasive slurries in concrete plants – they can handle it all.

Leader in innovation

Siemens is a recognized leader in the development of industry benchmark products for the construction materials sector. The ongoing improvements to existing products and application-driven new products keep Siemens at the forefront of process instrumentation. This continuous research and development investment process allows us to better serve our customers' ever-changing needs.

Unmatched portfolio

Siemens offers the most comprehensive product portfolio for the construction materials sector. With products designed specifically for this industry, we are confident that we can provide a measurement solution for even the most difficult task.

MindSphere – the cloud-based open IoT operating system from Siemens

Connectivity

With MindConnect, Siemens offers numerous possibilities for connecting machines, plants, and worldwide fleets to MindSphere, regardless of the manufacturer. MindConnect Nano for instance is a plug&play solution that enables you to read out data from your industrial asset and preprocess it for transfer to MindSphere – simply and reliably. The encrypted data is transferred securely to MindSphere, where it is then available for your analysis.

Options for connection to MindSphere:
- MindConnect Nano
- MindConnect IoT 2040
- MindConnect software
- Integration in SIMATIC and other Siemens products
- Further options already in progress

Digital services

In increasingly dynamic markets with ever more complex production requirements, data can make the difference between the success or failure of a company.

With MindSphere, Siemens is paving the way to digital services. These services offer a competitive advantage for customers through the use of data in the form of higher availability of individual machines, entire plants and systems, and globally distributed machine fleets, as well as improved productivity and efficiency.

MindSphere provides the technological platform for digital services from Siemens and 3rd-party suppliers, and combines a number of established and new technologies for data analysis, reliable connectivity and cyber security.

Open interfaces

MindSphere is designed as an open ecosystem, making it possible to exchange data across company boundaries and to connect a wide range of different products. Thanks to open standards and interfaces, data can be gathered from industrial equipment of many different manufacturers and analyzed in MindSphere.

Data sources:
- SIMATIC S7-300/S7-400/ET 200S
- SIMATIC S7-1200/S7-1500
- OPC UA
- Others in progress

Applications

The Siemens MindApps Fleet Manager and Visual Analyzer are already available on MindSphere. These apps help users to connect their machines, plants, and other industrial assets to MindSphere to configure them, to read out and to visualize the relevant data for analysis. Further applications are already in the pipeline and will be made available to users on an ongoing basis. MindSphere also offers the option of developing dedicated applications and using them on MindSphere as well as offering them to other users.

The possibilities here are practically unlimited. Use MindApps from Siemens and apps from other developers for:
- Predictive maintenance
- Energy Data Management Services
- Resource optimization
- Online monitoring of globally distributed machines
- And a lot more

Foundation for the future

Modernization plan doubles production, minimizes costs at California quarry

For the whole story, please read the article "Foundation for the future" in The Magazine at siemens.com/magazine.

For more than 40 years, Canyon Rock has literally been the foundation of its California community. The family-operated quarry has provided quality rock, concrete mixes, and sand for everything from roads and rail beds to parks and schools in Sonoma County and its environs.

Just as a new generation was taking control of the company, Canyon Rock won one of the biggest projects in its history – a large, time-sensitive job that would require a doubling of production as quickly as possible. Recognizing the urgent need to incorporate state-of-the-art technology, the new managers turned to a long-time business associate in EandM and the high-quality Siemens automation products and systems they distribute

Getting automated and integrated

The benefits of expanding and automating the operations were clear. Specifically, the company sought to minimize noise pollution by using more conveyors – instead of loaders – to move materials from place to place. Automating the materials handling operations with sophisticated controllers, motor starters, and variable-frequency drives (VFDs) enabled Canyon Rock to reduce its carbon footprint and cut fuel costs, all while significantly increasing throughput.

Time is of the essence

"We were behind schedule from the start," says Grant Schulz, engineering manager. "Present management's strong belief in automation and technology gave us the opportunity to bring Siemens state-of-the-art controls and systems on board. We needed a way to catch up, and we found it in Siemens' TIA Portal programming software."

"With TIA Portal, we were able to program all the Siemens products involved in the modernization with one package," Schulz explains. "A more traditional approach would have required three or four software tools and three or four diagnostic tools to do what we did with TIA Portal alone. It gave us the efficiency to roll out the systems with a speed that no other diagnostic tool could match."

The customer sees the one software package as the main reason they were able to complete the job in such a short time frame. "We were able to commission everything in a week," Schulz says. "Without TIA Portal, we could not have done it that fast. We could not have met contract obligations."

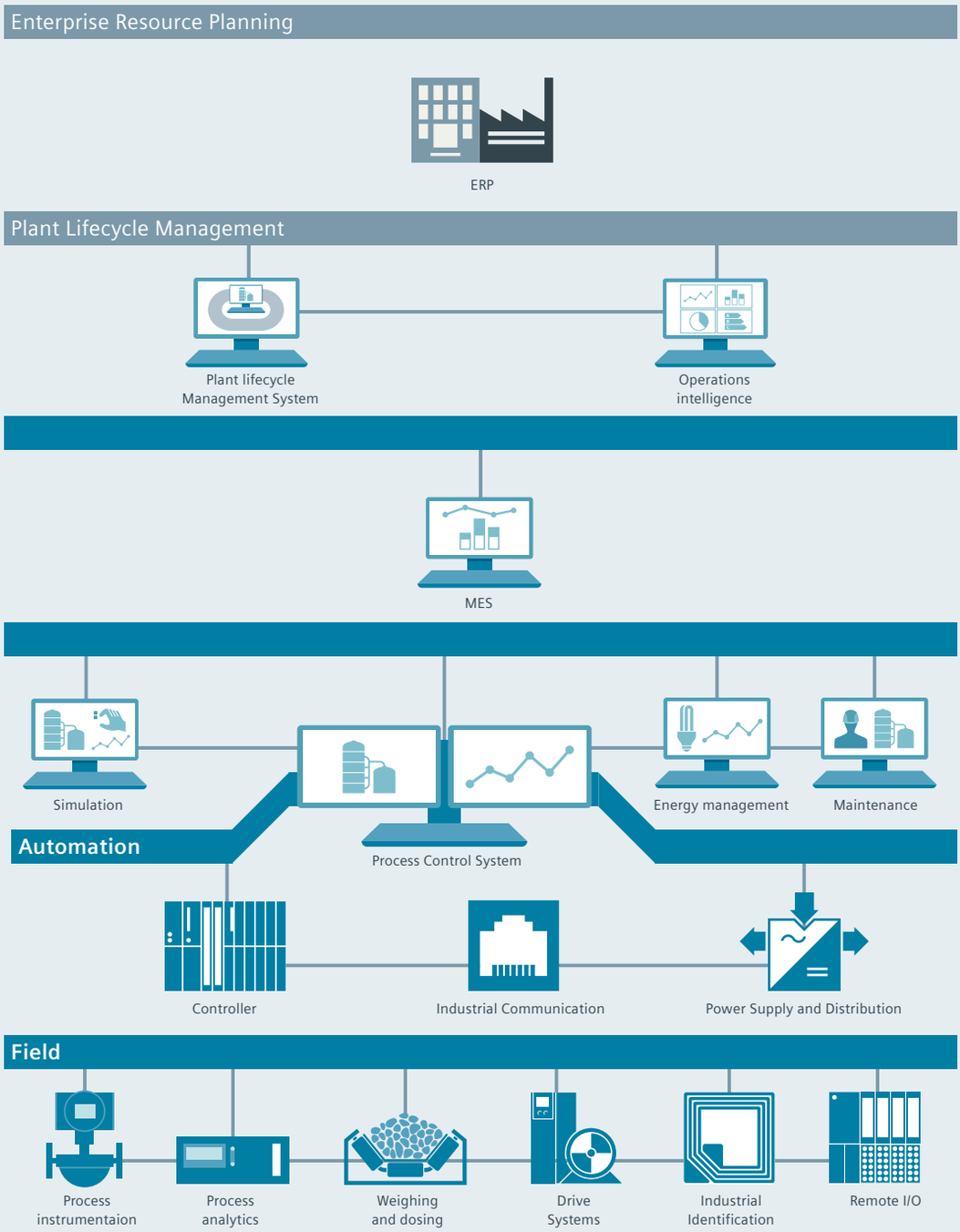
The project began with the installation of a plant-wide Profinet communications network and incorporated several Siemens product lines, including:

- SIMATIC S7-1200 PLCs
- 19-inch TP1500 SIMATIC HMI Comfort Panel (from which the entire plant is monitored and controlled)
- 3RA1 and 3RA61 motor starters with 3RW40 soft starters and SIMOCODE pro motor management
- G120 VFDs
- Various I/O devices, pilot devices, breakers, terminals
- TIA Portal programming software

Totally Integrated Automation

Siemens: everything from a single source – seamlessly integrated

Totally Integrated Automation Product Portfolio



With the **Totally Integrated Automation (TIA)** concept, Siemens is the only supplier of a comprehensive range of automation products and systems designed to work seamlessly together and covering the entire process chain in your plant. With TIA you also profit throughout the complete lifecycle of your plant – starting with the initial planning steps through operation to modernization.

Totally Integrated Automation:

- Reduces the number of interfaces.
- Ensures maximum data transparency.
- Covers all levels of your operation – from the field level through the control level to the management level. Combining Siemens technology and products with an impressive degree of integration into an automation system, TIA provides the foundation for all your planning and processes, from excavation to the final product.

TIA creates added value, in all automation tasks

Integrated Engineering

Less time, money, and effort – due to consistent, comprehensive engineering in all phases of the production process.

Industrial Security

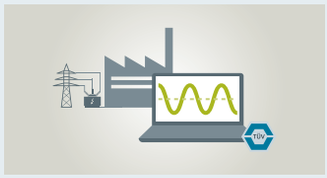
Systematically minimize the danger of an attack on your plant and machinery, through the consistent use of automation security mechanisms.

Industrial Communication

Unlimited consistent communication maximizes transparency across all levels – by using international cross-vendor standards.

Safety integrated

Reliable, comprehensive protection of people, machinery and the environment – through the seamless integration of safety into standard automation technology.



Energy Management

SIMATIC Energy Management enables you to analyze consumption data, identify potential for energy savings, and sustainably increase efficiency and productivity.

Condition Monitoring

To support predictive maintenance, SIPLUS CMS records and analyzes mechanical variables from machines, integrates them into the automation world, and provides decision making aids to maintenance staff, operators, and management.

Everything at a glance

Siemens portfolio for the construction materials industry

Automation

SIMATIC PLCs and Distributed I/O

SIMATIC S7-410E

- Special offer for applications with up to 200 process objects
- Standard, high-availability and fail-safe applications
- One PROFIBUS and two PROFINET interfaces

SIMATIC S7-1500

- Scalable performance and functionality
- Integrated system diagnostics with efficient fault analysis
- Fully integrated in the TIA Portal

SIMATIC S7-1200

- Modular and flexible compact controller for discrete and stand-alone automation solutions
- Fully integrated in the TIA Portal
- Perfect interplay with HMI, I/Os and drives

SIMATIC ET 200SP

- Multifunctional, highly modular I/O system
- Comprehensive module range, including power modules, digital or analog I/O modules, technology modules, motor starters

SIMATIC HMI Panels

Basic HMI Panels

- Cost-effective panels for simple visualization tasks
- 4", 7", 9" and 12" displays, combined key or touch operation
- High-resolution, dimmable wide-screen displays with 64.000 colors

Motors and drives

SIMOTICS Low-Voltage AC Motors

SIMOTICS GP General Purpose Motors

- Up to 45 kW
- Aluminum frame
- Efficiency classes IE1/IE2/IE3/IE4/ NEE/NPE
- Perfect for pumps, fans, and compressors due to low weights

SIMOTICS SD Severe Duty Motors

- Up to 200 kW
- Efficiency classes IE1/IE2/IE3/IE4/ NEE/NPE
- Rugged cast-iron frame to cope with harsh environments

SIMOTICS N-Compact

- 200 kW to 1,250 kW power
- Efficiency classes IE2/IE3 (to 375 kW)
- Corrosion protection – resistant against aggressive environments, high air humidity, high temperatures, and dust

Frequency Converters

SINAMICS G110

- Frequency converter in the lower power range (up to 3 kW)
- Simple installation and mounting
- Fast and straightforward commissioning using an optional operator panel or software engineering tool

SINAMICS G120

- Modular single-motor drive for small to medium power ratings (0.37–250 kW)
- Energy-efficient thanks to energy regeneration capability and low harmonics

Mechanical drives and geared motors

FLENDER Gear Units

FLENDER Helical Gear Units

- 1 to 4 reduction stages
- Reduction ratio of up to i = 450 and up to 1,400,000 Nm torque
- Vertical, horizontal, or upright mounting

FLENDER Standard Bevel Helical Gear Units

- 2 to 4 reduction stages
- Reduction ratio of up to i = 400 and 1,400,000 Nm torque
- Vertical, horizontal, or upright mounting

FLENDER Planetary Gear Units

- 37 sizes
- Torque ranges of up to 5,450,000 Nm
- Transmission ratios up to i = 4,000
- Low weight and compact, space-saving design

SIMOGEAR Geared Motors

Helical Geared Motor

- Power range up to 200 kW from 65 up to 19,000 Nm
- Rated gear unit torques
- Designs with one stage up to multiple stages allow reduction ratios up to 50,000

Parallel

- Power range
- Rated gear un 19,000 Nm
- Designs with stages allow 50,000

Motor control and power

SIRIUS Components for Switching, Starting, and Protecting

SIRIUS 3RA2 load feeders (3RV2, 3RT2, 3RB2)

- Improved availability and investment protection
- Integrated application monitoring
- Mounting without tools and wiring reductions of up to 75%

SIMOCODE pro Motor Management 3UF7

- Multifunctional, electronic full motor protection
- Independent of the automation system
- Fail-safe disconnection of motors

SIRIUS 3RR2 Current Monitoring Relays

- Fast diagnostics thanks to clear error messages on display
- Optimally matched to 3RT2 contactors, no separate current transformers required

SIRIUS 3RW Soft Starters

- Torque control for optimal acceleration
- Simple and fast commissioning thanks to user-friendly display

SIRIUS 3RF Solid-State Contactors

- Signaling of actuation via LED
- Space-saving assembly thanks to compact design
- Simple plug-in connection of control cable

SIRIUS ACT – Commanding and Signaling Devices

- Elegant and rugged product design (IP69K)
- One-handed installation and online configuration
- Standard wiring or direct connection to the controller via AS-i, IO-Link or PROFINET

Process instrumentation

Level Measurement

SITRANS LR560

- High-frequency 78-GHz FMCW technology for reliable operation in dusty environments at a range of up to 100 meters
- Lens antenna eliminates large antennas, providing a narrow 4° beam angle

SITRANS LUT400

- Suitable for vessels of differing size and shape, containing liquids, solids, or a combination of both
- Sonic intelligence and auto false-echo suppression for harsh process conditions

Echomax Transducers

- The high-frequency, noncontacting family of ultrasonic transducers with ranges up to 60 meters
- Self-cleaning and low-maintenance

Flow Measurement

SITRANS FM TRANSMAG 2

- Accurate, repeatable, fast-responding, and stable flow signal in heavy-duty applications
- Compensation for solids and magnetic particles

SITRANS

- Zero maintenance ten year battery
- Intelligent meter tion, data logging,

SIMATIC Embedded Automation and Industrial PCs

Advanced HMI Panels

- Designed for implementation of demanding visualization tasks
- Optimal readability with a wide viewing angle up to 170°
- High-resolution, dimmable wide-screen with 16 million colors

SIMATIC IPC427E – Embedded Box PC

- Ultracompact and maintenance-free Microbox PC
- Fanless design
- Flexible mounting options and installation positions

SIMATIC IPC477E – Embedded Panel PC

- 15"/19"/22" wide-screen single- or multitouch display
- Perfect interplay with SIMATIC S7-1500 Software Controller, WinCC RT Advanced, WinCC RT Professional and WinCC V7.x

SIMATIC NET

SCALANCE X Ethernet Switches

- Wide range of switches from simple to the most complex network topologies
- In control cabinets/boxes or cabinet-free designs

SCALANCE W-780 Access Point and W-740 Client Module

- Industrial wireless LAN (IWLAN) networks for 2.4 GHz or 5 GHz
- Suitable for real-time and redundancy requirements, such as PROFINET or PROFIsafe

Low-voltage

SINAMICS G150

- Universal drive with V/f control and vector control
- High-rated single-motor drives from 75 up to 2,700 kW
- Standard cabinet or chassis module design

SINAMICS S120

- Modular drive system for demanding applications with energy regeneration
- Up to 4,500 kW
- Booksize, chassis, and cabinet formats

SINAMICS G120P

- Optimized for pump, fan and compressor applications (up to 400 kW)
- Preimplemented functions are extremely easy to use
- Built-in and wall mounting units

Medium-voltage

SINAMICS GM150

- Medium-voltage drive solution for single-motor high-rating drives (820 kW–17 MW)
- Perfect for applications that do not require energy recovery like pumps, fans, mixers, and crushers

ROBICON Perfect Harmony

- Medium-voltage drive precisely scalable for a very wide range of voltage and output power
- Modular design and ability to bypass any one cell during operation while maintaining the full output voltage

Shaft Geared Motor

up to 200 kW
it torques from 150 up to

two stages up to multiple
reduction ratios up to

Bevel Helical Geared Motor

- Power range up to 200 kW
- Rated gear unit torques from 50 up to 19,500 Nm
- Designs with two stages up to multiple stages allow reduction ratios up to 50,000

FLENDER Couplings

Flexible Couplings

- N-EUPEX, N-BIPEX, RUPEX compensate shaft misalignments and absorb moderate shock loads of motors and driven machines

Highly Flexible Couplings

- ELPEX Flexible, ELPEX-B, and ELPEX-S are highly suitable for connecting machines with significant nonuniform torque characteristics
- Transmission of torque possible with barely any circumferential backlash

Hydrodynamic Couplings

- FLUDEX couplings: coupling parts are not mechanically connected and therefore not subject to wear
- For soft and shockless starting of machines and conveyors

SIPLUS CMS1200 with SM1281 module

- Continuous condition monitoring of equipment via vibration sensors
- No additional software required for diagnostics and visualization
- Simple data archiving

SENTRON Power Supply

3WL air circuit breakers

- Three sizes covering 630 A to 6,300 A
- Fixed-mounted and withdrawable designs
- Full communication capability via Profibus DP or Modbus communication

3VL molded-case circuit breaker

- Compact design, excellent technical characteristics, and easy operation
- Available as thermal-magnetic (16 A to 630 A) or electronic (63 A) trip units

PAC3200 measuring devices

- Measures 50+ electrical parameters for active, reactive, and apparent energy
- The measuring accuracy for active energy and for powers is ±0.5%, for voltages ±0.3%, and for currents ±0.2% – unparalleled in this class of devices

SIVACON

SIVACON S8 Power Distribution Boards

- High level of flexibility and cost efficiency thanks to the modular design
- Wide range of connection options to the section busbar system

SIVACON S8 Motor Control Centers

- High level of personal safety, thanks to closed front doors in all withdrawable unit positions (connected, test, disconnected)
- Long service life thanks to patented, wear-resistant contact system

FM MAG 8000

– no moving parts and life
– capable of leak detec-
and error self-detection

Pressure and Temperature Measurement

SITRANS P DS III

- Local display and programming capabilities
- Predictive maintenance functions enable maintenance prior to device failure

SITRANS TF

- Local sensing of measured values on digital display
- Rugged two-chamber enclosure in die-cast aluminum or stainless steel

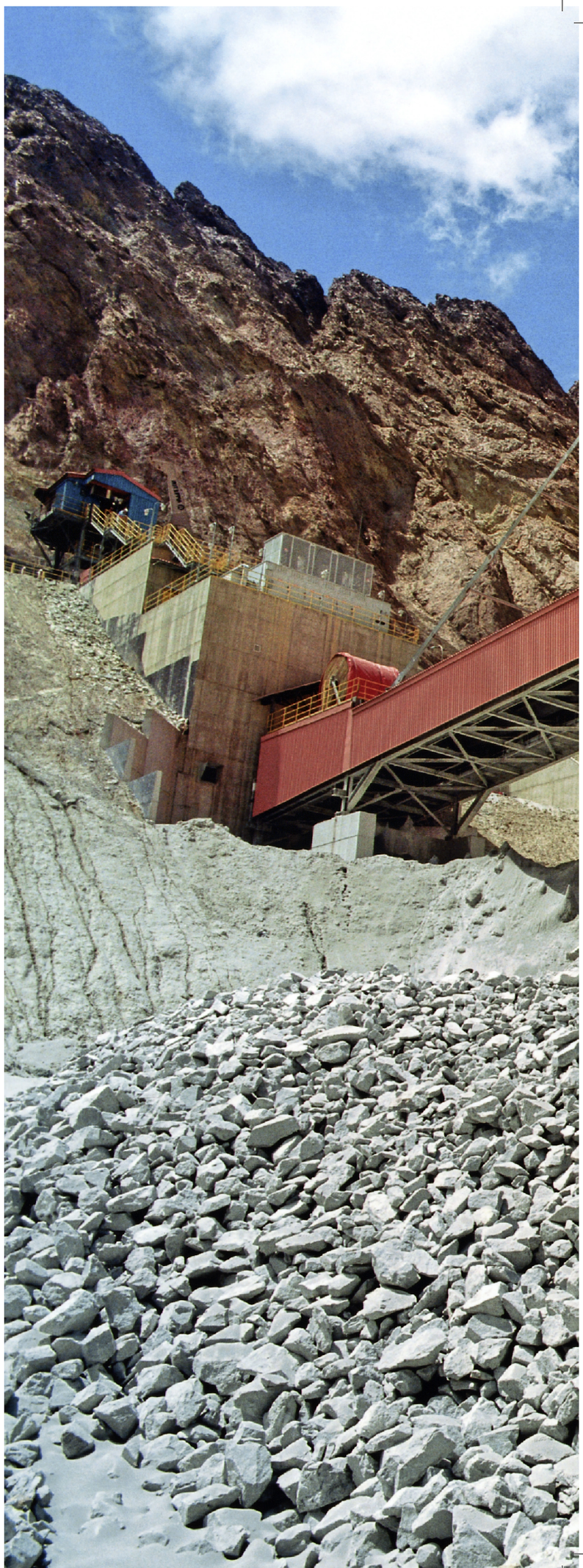
Weighing Technologies

Milltronics MSI

- Unique parallelogram-style load cell design
- Outstanding accuracy and repeatability

SIWAREX FTC

- Uniform structure and universal communication through integration in SIMATIC S7 and SIMATIC PCS 7
- Measurement of weight or force to resolutions of 16 million parts



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