

FUTURE-PROOF COMPLETE SOLUTIONS FROM ONE SOURCE

Electrics and Automation





**SMS
SIEMAG**
SMS group

OUR HOLISTIC SYSTEMS EXPERTISE MAKES YOUR COMPANY FIT FOR THE FUTURE

You can see, at ever shorter intervals, how day-to-day requirements and framework conditions are changing – whatever part of your company you look at. Only those who act fast and with foresight can defend and expand their market position. One aspect playing an increasingly important role here is the automation of metallurgical plants. It impacts on both the total output of the plant and the high quality of all end products.

As a global leader in metallurgical plants, we take our responsibility very seriously, always offering you holistic, intelligent solutions. That's anything but standard, because even experts, especially in the metallurgical and rolling mill industry, find it very hard to keep up with all the innovations in plant technology around the world, and to reliably assess how to interact. Equally difficult for our customers is seamlessly coordinating various partners from the extremely complex fields of mechanics, electrics, and automation. Yet you can relax.

Why? Because we take care of everything. From thorough analysis of your current situation to far-sighted planning and consulting, through to the implementation of your new or revamped production plant and the system support for the plant. There is no such thing as an off-the-peg solution from us. Our panel of experts teams up with you to develop flexible, cost-conscious, tailor-made solutions every time. Holistic, efficient, and future-proof.



OUR SYSTEM FOR YOUR PERFECTLY INTEGRATED SOLUTION

- **X-PACT® – MODULAR AUTOMATION PACKAGES**

X-Pact® controls the processes in metallurgical plants and rolling mills from the initial electrics to integrated production planning

- **“PLUG & WORK” TESTING**

Testing, optimization, and training – long before on-site plant assembly and commissioning

- **ENERGY DISTRIBUTION AND DRIVE SYSTEMS**

Precisely tailored to the overall design of mechanics, electrics, and automation

- **HARDWARE DESIGN AND PLANT ENGINEERING**

From automation and drive systems to safety technology, switchgear rooms, control platforms, and cable layout planning

- **THE CONTROL STATION AS THE CENTRAL HUB**

Fully in the picture so you can respond effectively and rapidly

- **INCREASED EFFICIENCY OF PRODUCTION PLANTS AND SYSTEMS**

Opting for conversions and revamps, updates and upgrades secures your future

- **FAST AND RELIABLE SUPPORT WORLDWIDE**

Expert service teams ensure quick response and assistance

- **EXPERIENCE THAT IMPRESSES**

Projects and areas where our system competence has been successfully applied

THE WHOLE IS MORE THAN THE SUM OF ITS PARTS

Only specialists who think in holistic terms can pinpoint the crucial details. It's not enough to achieve top performance in just some areas. That's because ultimately, lasting success depends on a consistently strong overall performance.

This is why we combine our many years of experience in mechanical systems with the know-how gained from the hundreds of automation systems and plants we have designed and built for our customers worldwide. Applying this expertise also ensures that your technological process lines transform into sustained value-adding chains. Equally important here is the "zero-error-tolerance" principle underlying our basic philosophy.

X-PACT® – WORLD-LEADING AUTOMATION KNOW-HOW

X-Pact® is a crucial success factor in the realization of complex plants. This is where everything comes together for controlling, monitoring, checking, evaluating, and coordinating the plant. As a holistic electrics and automation package, X-Pact® makes sure all plant parts mesh with each other and work smoothly together: from energy supply and distribution through drive technology, instruments and automation, and production planning.

HOLISTIC SOLUTIONS ON A MODULAR BASIS

All electrical and automated functions included in X-Pact® are performed by globally available components of modular design. That ensures standardized solutions for all tasks – carefully worked out according to international standards. This guarantees you maximum reliability, service, and independence in production. And furthermore, it helps you make any necessary adjustments in next to no time.

PRODUCTION AND QUALITY ALWAYS UNDER CONTROL

The X-Pact® production planning and control system provides you with all the tools you need for effective planning and quality assurance of the processes in your metallurgical plant and rolling mill.

FULLY INFORMED – FULLY IN CONTROL WITH PLANT MONITORING

You know the old saying "prevention is better than cure". It also applies to plant technology and automation. What's vital here is being able to detect, at an early stage, problematic operating conditions or the imminent approach of wear limits of plant parts. There is no better way to plan how and when to carry out repair, maintenance, and optimization work. Furthermore, this significantly reduces unplanned stoppages entailing higher repair costs and production losses. The integrated SMS Siemag Monitoring System maps the plant status, creating a "transparent

plant". It uses intelligent evaluation algorithms to monitor and analyze defined signals and sensor data. Out of this comes a diagnosis that enables the system to generate recommendations for maintenance and optimization. These are then displayed on the HMI or transferred to existing maintenance systems.

CUTTING ENERGY COSTS WITH X-PACT® ENERGY ADVISOR

Today's rising energy costs, limited raw material reserves, and political requirements urgently force plant operators to adopt holistic energy management. That applies specifically to companies in the energy-intensive metallurgy and rolling mill industry because this range of issues is increasingly becoming a key factor in competitiveness and overall efficiency.

X-Pact® Energy Advisor is a data management system that helps make your production energy-efficient, cutting your energy costs. You can continue to use your existing sensor technology and add other measuring instruments later at low outlay and effort. And it's not just about electricity – X-Pact® Energy Advisor also logs other relevant media such as fuels, gases, compressed air, heat, and water.

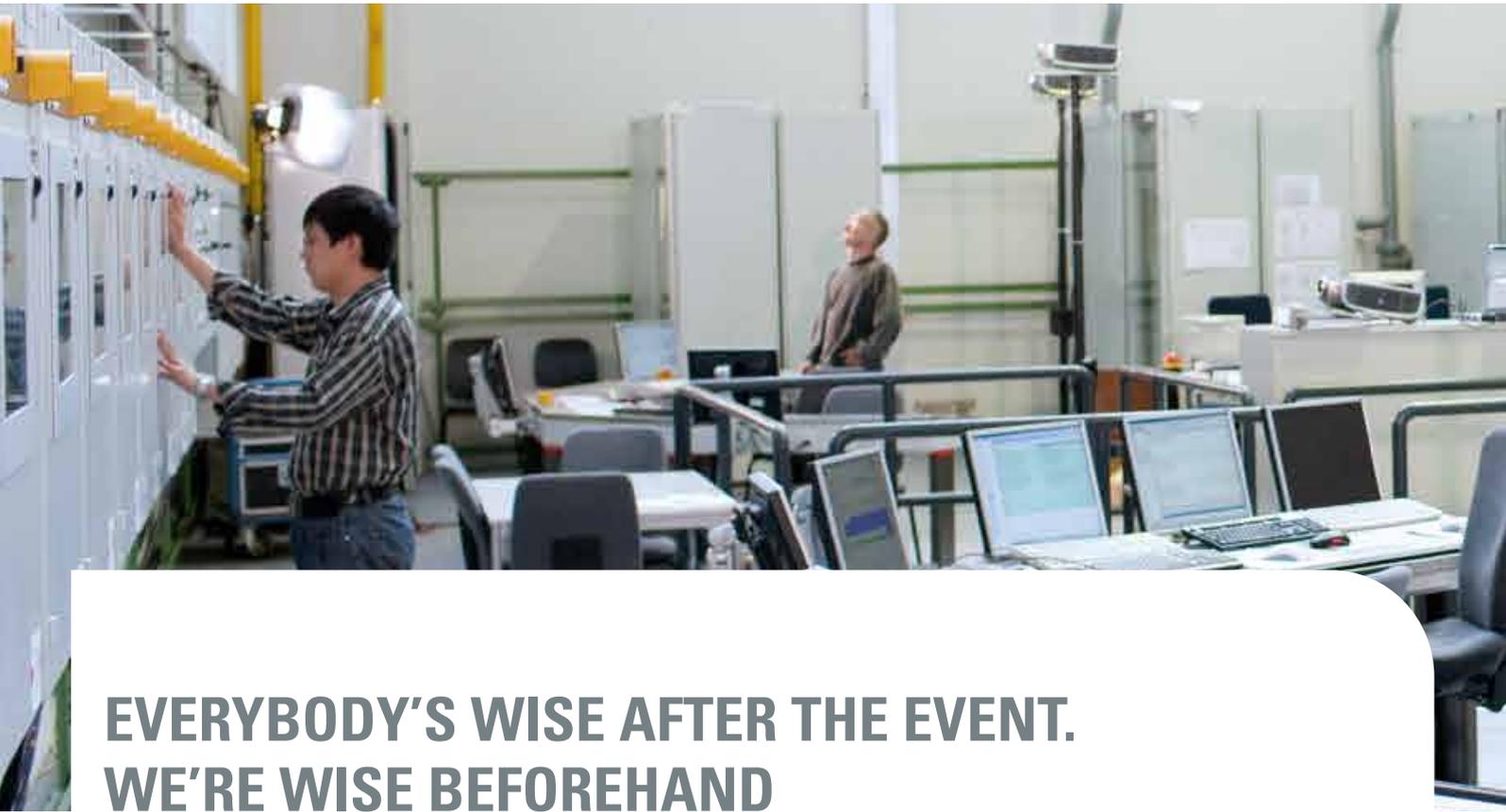
Working from product and process data, the system delivers an analysis of the plant's energy efficiency and supports continuous improvement.



ELECTRICAL AND AUTOMATION WITH X-PACT®

- Combines with the mechanics and technological components to form a seamless unit
- Creates electrical and automation solutions precisely tailored to the requirements of the metallurgical and rolling mill industry
- Provides for pre-optimized systems tested under real-life conditions, for both new plants and modernizations





EVERYBODY'S WISE AFTER THE EVENT. WE'RE WISE BEFOREHAND

We've been passionate about metals for more than 140 years. Being rooted in this long history has helped us hone our experience and in-depth insider knowledge about the construction of plants for the steel, stainless steel, and non-ferrous metals industry. Today, all our customers benefit fully from this expertise. Even long before their new or revamped production plants are commissioned.

TIME IS MONEY, AND WASTED TIME IS WASTED MONEY

We are acutely aware that every second counts when it comes to plant availability in your company. That's why we developed a process implemented in advance of assembly and commissioning to save you a great deal of precious time. We named it "Plug & Work". What the solution means for you is that we test and pre-optimize your new automation system as a complex unit in our test center long before assembly on your shop floor.

Included here is a near-reality, real-time plant simulation that maps your specific plant including all kinematic and dynamic operation parameters. Plug & Work measurably accelerates plant runup and considerably cuts commissioning times.

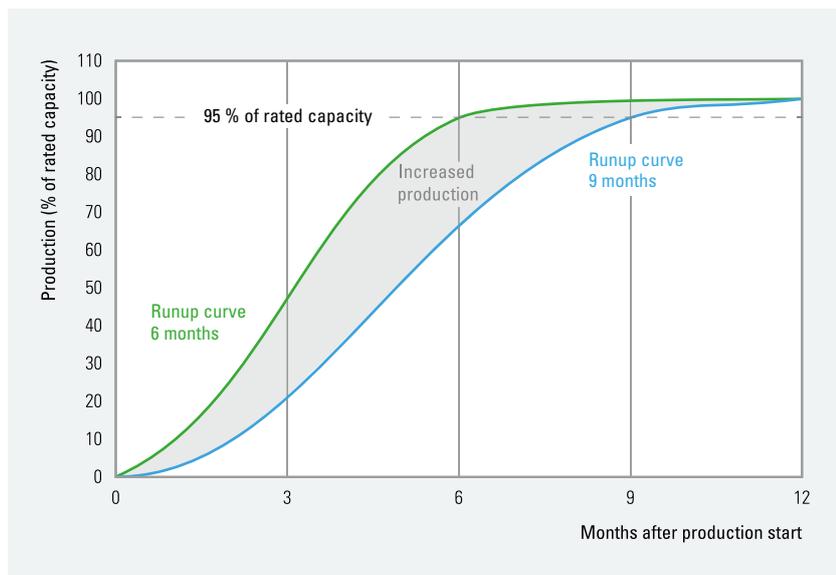
EVERYTHING RUNS SMOOTHLY. EVEN BEFORE STARTUP

You also benefit from the simulation because it enables SMS Siemag instructors to train your operating personnel on the original control desks, again long before plant erection in your company. Through being involved in virtual production operations, your employees learn the plant functions and how to control them in realistic situations. This is how testing offers near-reality training for ideal, time-saving instruction of operating and maintenance personnel for their future work on the plants. As a result, you start production and achieve efficient operation almost immediately.



+ PLUG & WORK

- Shorter commissioning and fast runup
- Reduces cost and effort for on-site troubleshooting
- Readies both operating and maintenance personnel for work on the plant





HOLISTIC THINKING MEANS SAVING COSTS ON EVERY DETAIL

There is close cooperation between our mechanical and electrical engineering departments, so we can optimize drive trains in line with real process requirements. Going hand in hand with our plant designs are detailed considerations tailored to the individual equipment configuration you need.

What that means for your company: Our holistic approach ensures optimum use of your components and minimizes inefficiencies. That ensures a palpable reduction in investment and operating costs.

COORDINATED ENERGY SUPPLY

It all starts with an in-depth network analysis. Then we advise you thoroughly on the right strategy for integration into the common network. Included are:

- Determination of the energy requirements of the individual process stages
- Layout of the energy supply network
- Specification of the network components of the high, medium, and low-voltage switchgear, transformers, compensation and filter systems, emergency power generators, and UPS units
- Dimensioning and detail engineering of switchgear rooms

WIDE-RANGING EXPERIENCE FOR POWERFUL DRIVE SYSTEMS

Our drives for metallurgical applications have no problems in operating powerfully even in the megawatt range. At the same time, they are capable of high-precision control. Due to their optimum layout and use of cutting-edge drive systems, your plant can operate with high energy-efficiency. What matters here is that we continually develop the necessary strategies in cooperation with big-name suppliers. This creates special know-how and a practical approach we use to design your drive trains (medium-voltage switch, converter transformer, converter, and motor) in dimensions that match your real process requirements.

Optimizing the drive system in this way means we ensure you get a plant with maximum flexibility in the design of your production programs.

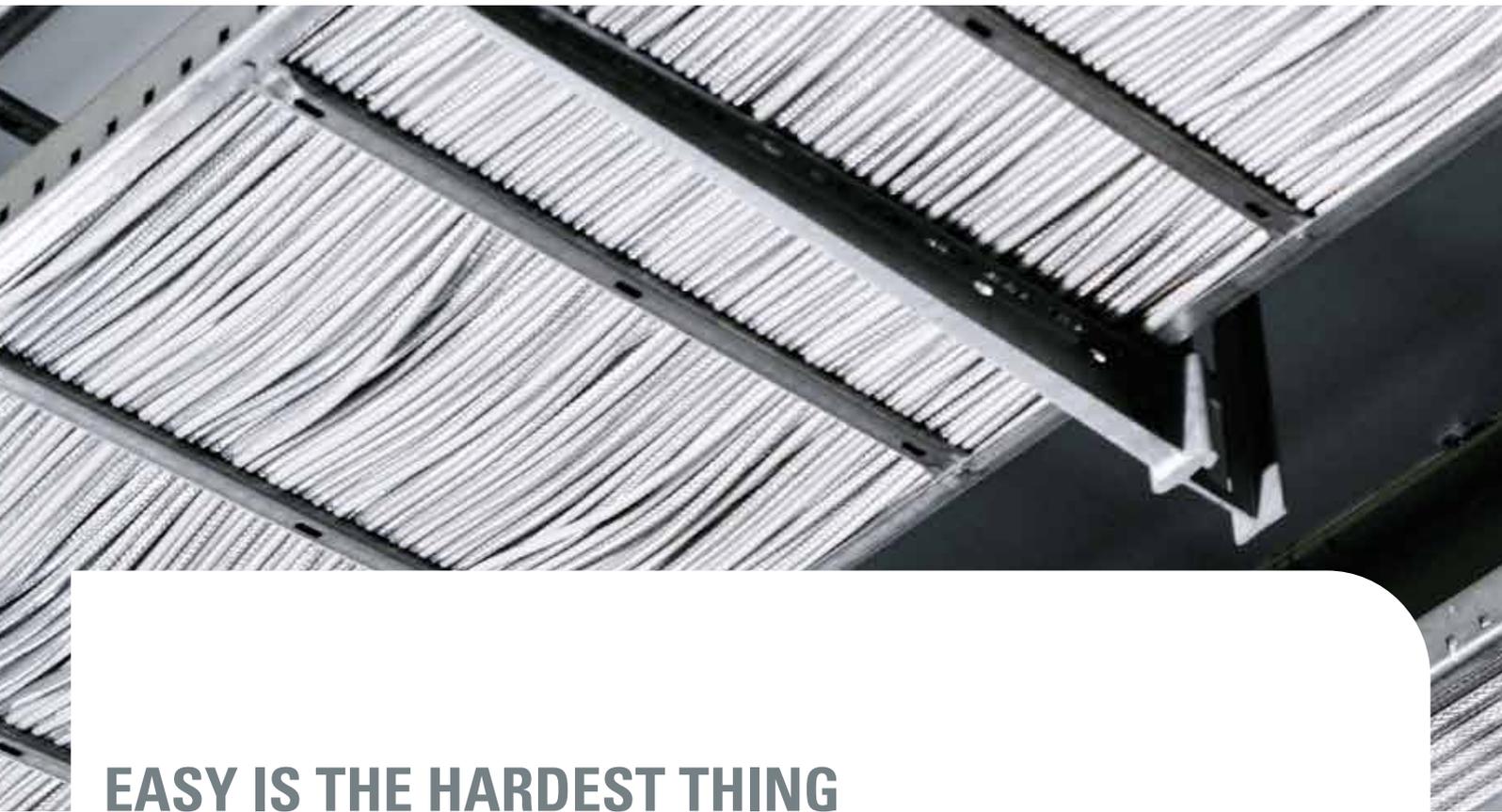
Invaluable here is the control cabinet we have developed for the auxiliaries of large drives because it controls and monitors all the media for the motors and the drive transformers. So, wherever you source your drives, they seamlessly connect with our plant automation system.



ENERGY DISTRIBUTION AND DRIVE SYSTEMS

- Matched precisely with the plant mechanics, electrics, and automation
- Highly flexible in terms of production program design
- Extremely energy efficient, optimized lifetime costs





EASY IS THE HARDEST THING

Sure, today almost anything seems technically possible. Theoretically. Yet, in practice, all processes have to be profitable, manageable, reliable, and safe. Even state-of-the-art, complex plants must be easy to operate, monitor, maintain, and modernize. That's why integrated engineering – the linking of independent units to form a superordinate whole – is becoming ever more important. To put it simply: the objective is to achieve optimum integration of independent engineering tools to create a cost-effective over-all tool.

This has long been our recipe for success in hardware and plant engineering: relying above all on highly motivated employees with comprehensive product know-how, efficient use of powerful engineering tools, and integrative cooperation with the associated fields of mechanics and electrics.

SIMPLE AND EFFECTIVE PRINCIPLES FORM A RELIABLE FOUNDATION

Our automation requirements for all systems are identical: stability, easy maintenance, simple adaptation to new conditions, and high technological capability. Significant here is that all our systems are based on uniform platforms with a modular design, reflecting current trends in hardware and software.

Everything is broken down into separate levels (base modules, technology modules, plant-specific modules), so elements only have to be customized where necessary. If the IT environment changes, for instance due to a new type of PC, just the basic modules need to be modified. Similarly, when new technologies such as different rolling models come into play, only the technology modules are affected.

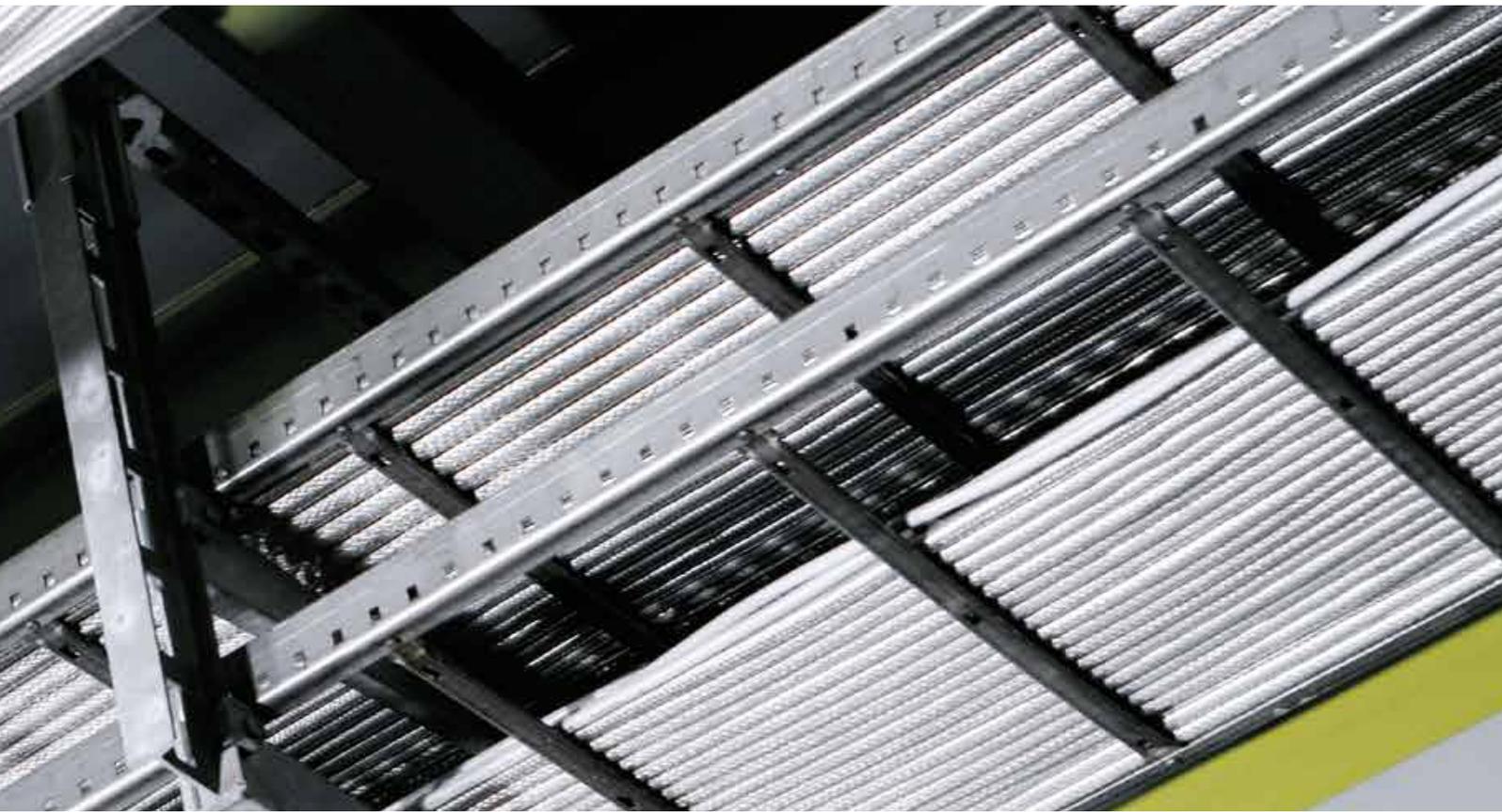
EVERYTHING FROM ONE SOURCE – ALL FOR ONE GOAL: YOUR BUSINESS SUCCESS

SMS Siemag supplies professionally integrated hardware solutions for electrics and automation in all product areas. Included here are the engineering and implementation of automation systems, drive systems, and safety technology. The plant-wide engineering comprises planning of the switchgear rooms and control platforms as well as assembly engineering for the cable conduit layout.

SAFETY FIRST

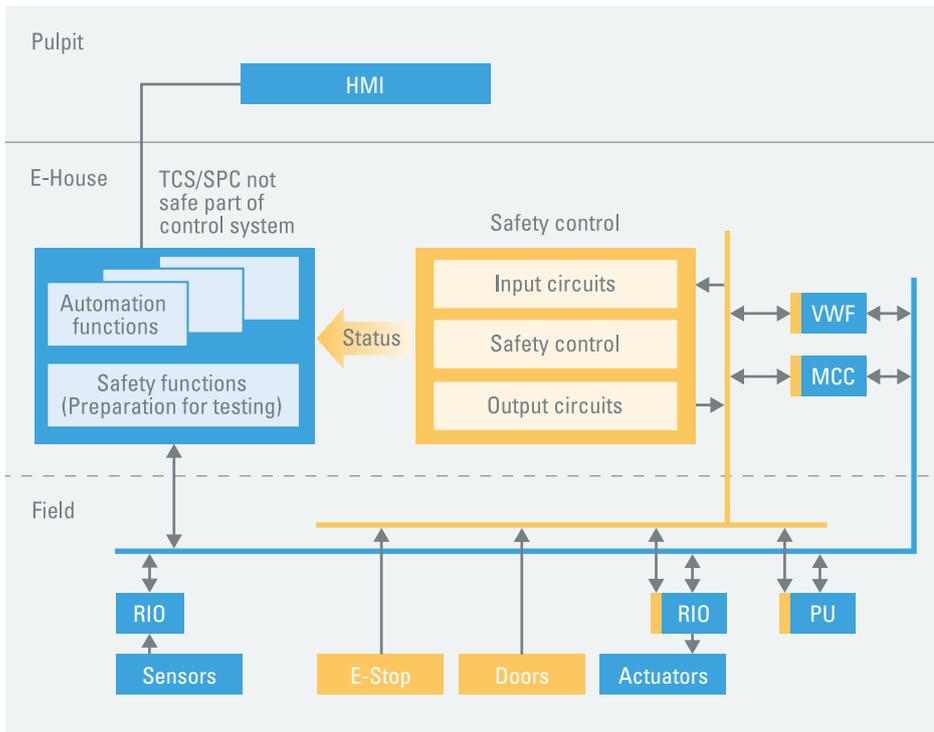
You can be sure that the level of safety of every plant we produce complies with the laws and directives enshrined in European and international safety standards. Here again, we team up with you to devise tailor-made practical solutions, with the safety control functions executed separately from the machine control systems.

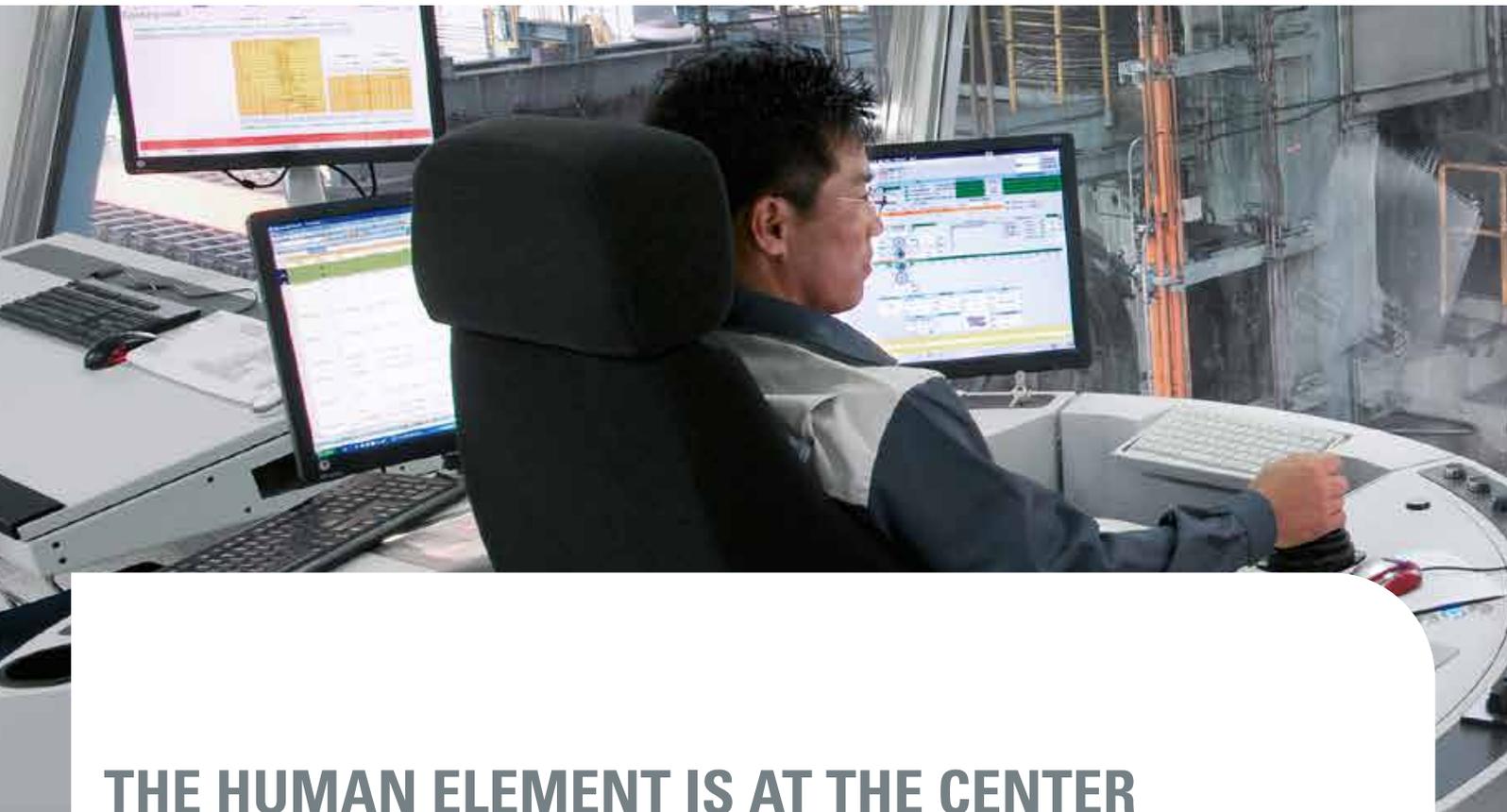
And, of course, the safety control functions are also put through their paces in advance during our Plug & Work tests.



HARDWARE DESIGN AND PLANT ENGINEERING

- All our systems are based on uniform platforms with a modular design, reflecting current trends in hardware and software
- Safety control functions are separated from machine controls
- Clearly structured and maintenance-friendly hardware documentation





THE HUMAN ELEMENT IS AT THE CENTER

The control station is the control hub of every plant. This is where everything comes together – where commands are issued. And it's where the people work who need to watch the whole process and have it all under control: your operating personnel. Essential for them is to create a work environment that transports a feeling of security and calm. Ensuring they take the right decisions at all times.

FORM FOLLOWS FUNCTION

The control station's division into meeting and working areas exactly reflects the activities of the operating personnel. Worthy of center stage, ergonomics is key and supports all activities in the control station. Included here are soundproofing and light-dimming features that avoid distraction from the main tasks.

The control desk layouts are designed jointly with future operating personnel. Naturally, we allow for your in-house corporate design.

EASY OPERATION AND ADVANCED SAFETY

Despite the high degree of automation, operators must constantly maintain a full overview and be able to react quickly. To minimize the potential for human error, the system must report irregularities clearly but without creating excessive stress.

The visualization interface developed by SMS Siemag makes use of the human ability to perceive and process information. This is how operators are guided through the process chain at all times in a user-friendly, easy-to-grasp way. Individual stages are configurable, supporting the intelligent navigation through screen masks. Displayed here are mask layouts that always focus squarely on the production processes.

It only takes simple actions to visualize and control highly complex plants. Assistant systems guide through the process chain, displaying in-depth information on command without deviating from the main path. Using the intelligent navigation, the operator can see a process in detailed steps, or jump quickly and easily in an exceptional situation. The inclusion of touchscreens and mobile devices now paves the way for the next generation of operating systems.

Our HMI systems link the plant and the operator. They map the production process with all the relevant information. Armed with the information from this process observation, you can use the latest graphical interfaces to manually access the various sequences and machine groups.

All these visible and hidden components, tools, programs, and technologies must be reliably controlled, monitored, and managed. That takes operating personnel who keep a clear head and a keen eye on everything. They must be well trained and instructed so they can expertly handle all the necessary processes. Our specialists work intensively with future operating teams to ensure things are just right. Included here is everything from consultation about the ergonomic design of the various control stations to simulation-based coaching during our Plug & Work tests.



THE CONTROL STATION AS THE CENTRAL HUB

- Division of the control station into meeting and working areas to reflect the activities of the operating personnel
- User-friendly, easy-to-understand visualization interfaces guide operators through the process chains
- Integration of modern touchscreens and mobile devices
- HMI systems for production-centered representation of the process provide manual access to all sequences and machine groups





TOMORROW, TODAY'S TECHNOLOGY CAN BE YESTERDAY'S

As a producer in the metallurgical industry, you know how important it is to constantly add to your production equipment so you retain your market standing with excellent product quality. Only producers who continuously and flexibly upgrade the capacities of their plants and systems to meet current technological demands can ensure they stay ahead in the future. There are few fields driven by such rapid development as electrics and automation. The various components of a complex production plant remain up to date and therefore competitive for very different periods of time.

Take today's automation platforms. They have a lifetime of roughly 10 years, whereas mechanical systems remain current for much longer. Consequently, plant owners usually have to upgrade and replace electrical components and automation much earlier than their mechanical equipment.

Keeping a close eye on this and reacting in time are essential. That goes for the big picture as well as the smallest details. Why? Because a chain is only as strong and reliable as its weakest link. It may be an old saying, but in our high-tech world it's still as true as ever.

LET'S TALK

We believe in getting to know you and your company and working closely together right from the start. That's why intensive talks, critical analyses, and detailed definitions of your needs are always the first steps. Whether you want a revamp of your existing plant involving alteration of mechanical components and replacement or extension of electrics and automation, or a complete replacement of the entire automation – we're ready to talk.

To begin with, our specialists determine the current state of your plants, including electrical components from different sources and development phases. Then they carefully examine the typical operating parameters before drawing up a holistic plan for a modernization or upgrade. All this goes to show that we value and welcome the complex, individual, and exciting challenge of optimizing your plant.

EXPERIENCE MAKES US FAST AND PRECISE

Particularly crucial for updates and revamps is rapid completion of the job. That's why our top priorities in every project are minimum downtimes and maximum operating phases.

Here, above all, the extensive experience and associated flexibility of our special teams make all the difference. Wherever possible, we plan the implementation of large revamp projects during ongoing operations, utilizing marginal operating times, nights, and weekends.

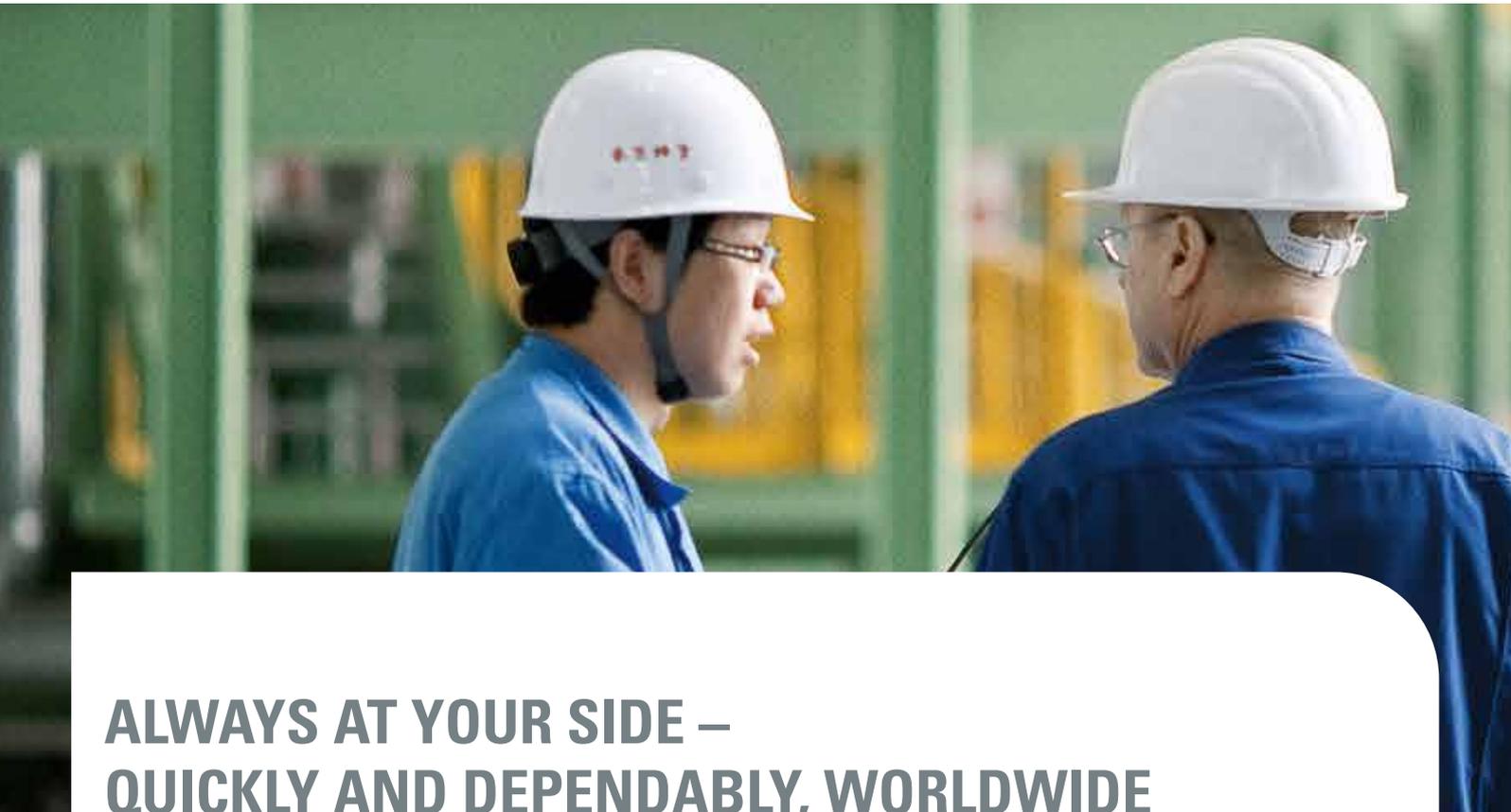
Especially for upgrading complex interfaces and production-critical plant parts, a switching plan is the ideal procedure. It enables you to test partial functions of the new automation system over several planned maintenance standstills prior to the conversion standstill itself. Included in the switching plan is so-called listening mode or shadow operation. The procedure makes it possible to capture and analyze the relevant data and signals from the existing automation system. This is how we are able to achieve recommissioning within very tight deadlines, giving you additional reserves for an early return on investment.



CONVERSION, EXPANSION AND MODERNIZATION

- Current status analysis and detailed definition of requirements
- Shortest possible conversion or expansion times for updates, upgrades, and revamps
- Earlier return on investment due to fast recommissioning





ALWAYS AT YOUR SIDE – QUICKLY AND DEPENDABLY, WORLDWIDE

Quite rightly, our customers expect not only holistic, efficient, and future-compatible automation solutions from us. They also rely on prompt assistance in case of plant disruptions. That's why we are represented around the globe and always there for you.

Worldwide, almost half of our experts in the Electrical and Automation Division are stationed in China, India, and the US. What's especially important to us is that production know-how and further development of solutions remain at our German locations in Düsseldorf and Hilchenbach.

LIKEWISE, OUR SERVICE IS TAILOR-MADE

It should be no surprise that you can choose from an extensive range of individual services. However, we also offer complete service packages. These are customized service contracts we draw up to support you in an intensive partnership. They guarantee consistently reliable and cost-effective operation of your plants.

The various services we provide can be ideally compiled into a package and scaled in accordance with your requirements. Included among your options are:

- Plant and process monitoring
- Hotline
- 24/7 tele-service
- Training prior to and during operation
- Support from plant and technology experts
- On-site troubleshooting
- Technological dialog
- System upgrades and updates
- Technological upgrades
- Spare parts service

YOUR DIRECT LINE TO OUR SERVICE

The automation experts in our branches in Asia, Europe, and North and South America guarantee service close to you and all our customers covering the entire spectrum of our work. This involves controlling and coordinating our global activities from our Düsseldorf and Hilchenbach locations in Germany. Working from our headquarters and using today's excellent communications options means we ensure uniform standards worldwide. Optimization of your automation, comprehensive diagnosis, forward-planning for plant maintenance, and if necessary online troubleshooting help considerably increase your plant efficiency.

The benefit of all this to you is that with your consent, our specialists can use a secure, web-based connection to access your plant and evaluate status information "live". That enables them to analyze or even remedy faults.

WE HELP YOU HELP YOURSELF

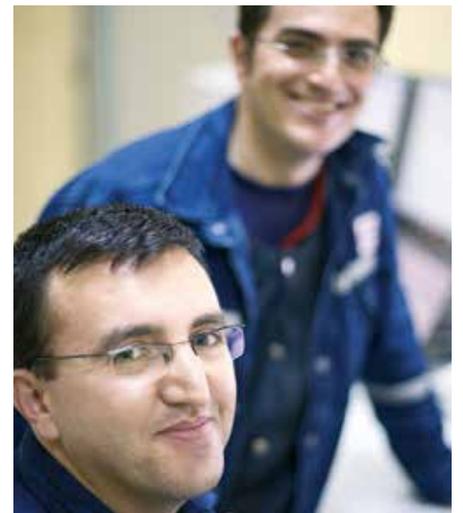
Our combined expertise, extensive experience, and comprehensive know-how are available to make not just your production plant but also your employees fit for the future. You can choose from a wide range of classroom and on-site training courses on offer from our TECademy. They are ideal for getting your staff up to a precisely defined level of knowledge and skill. The courses are designed for both operating and development personnel.

There is a wide spectrum of topics and methods designed to unleash your potential. Furthermore, the content and conduct of lessons focuses on metallurgical and rolling mill processes. That's how our training modules bring your employees bang up to date with the latest technology. Systematically, throughout the various phases in your plant's lifetime. Before and during operation, when extra functions are added, and for all modernizations.



SERVICE AND TRAINING

- Holistic services, configured to suit you
- Effective service packages
- Fast, global availability
- Know-how transfer through scalable training courses for your operating and maintenance personnel



OUR WIDE RANGE OF PRODUCTS – TRIED AND TESTED WORLDWIDE

HOLISTIC EFFICIENT AND FUTURE-PROOF



As a globally leading manufacturer of metallurgical plants, we supply flexible, fairly priced, and tailor-made solutions based on profound expertise. They meet all requirements of today's metallurgical plant and rolling mill technology. This is how we make companies worldwide fit for future challenges and opportunities, also by providing cutting-edge electrics and automation.

STEELMAKING PLANTS (EAF, LF, BOF, CONARC® AND AOD)



- Flexible calculation of charging materials
- Dynamic process control
- Slagging practice in the EAF
- Easy integration of lance systems
- Low-maintenance valve stations
- Intelligent converter tilting drives
- Ladle management
- Solutions for secondary metallurgy plants
- Fully automated logistics system
- SAF process monitoring

CONTINUOUS CASTERS



- Mold level control
- Hydraulic mold oscillation drives
- Width adjustment of mold narrow sides
- Hydraulic segment adjustment with Soft Reduction
- Mold Monitoring System (MMS) with breakout prediction, longitudinal crack detection, and heat transfer calculation
- Dynamic solidification control

HOT ROLLING MILLS



- Model for pass schedule calculation
- Profile, contour, and flatness control
- Rolling sequence control
- Thickness control
- Material property model
- Thermo-physical cooling models
- Coilbox control
- Camber and wedge free rolling
- Functions for perfect strip guidance
- Cutting optimization in heavy plate manufacturing
- Minimization of head and tail scrap
- Leveling models for heavy plate manufacturing



COLD ROLLING MILLS

STRIP PROCESSING LINES

ALUMINUM ROLLING MILLS

PLANTS FOR NF METALS



- Model for pass schedule calculation
- T-Roll model
- Profile and flatness model
- Thickness control
- Flatness control
- Flatness measuring system
- Flying gauge change
- Elongation control

- Pickling model for carbon and stainless steel plants
- Service-friendly, material-friendly strip transport controls
- Catenary control systems
- Dynamic layer thickness controls
- Flatness control
- Flatness measuring system

- Model for pass schedule calculation
- Profile and flatness model
- Thickness control
- Flatness control
- Flatness measuring system

- Model for pass schedule calculation
- Profile and flatness model
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SMS Siemag AG

Electrical and Automation Systems Division

Wiesenstrasse 30
57271 Hilchenbach | Germany

Ivo-Beucker-Straße 43
40237 Düsseldorf | Germany

Phone: +49 211 881-5895
Fax: +49 211 881-775895

Email: automation@sms-siemag.com
Website: www.sms-siemag.com

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