REGIONAL ENGINEERED SERVICES

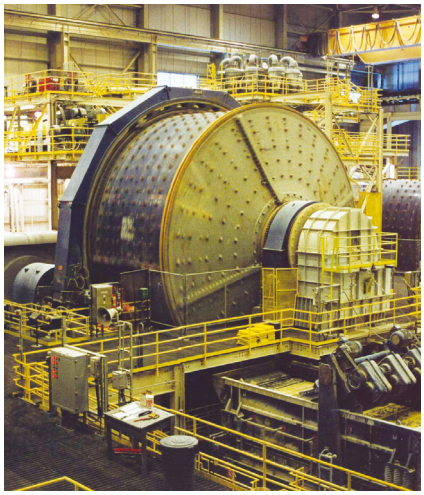
TO HELP YOUR OPERATION BE ALWAYS OPTIMAL

ANDRITZ

ENGINEERED SUCCESS

The challenge: Everything is bolted down and connected—but will my plant actually start up?

THE SOLUTION: SIMULATE. MEASURE. CONTROL. AND PROFIT.



The control system in a modern industrial facility touches every piece of equipment and instrument in the plant, like a nervous system touches every muscle and receptor in your body. Nothing will be conveyed, ground, classified, pumped, floated, roasted, calcined, or dried until the plant's "nervous system" is operationally ready. In short, the control of your plant's system can mean the difference between profit and loss.

That's why ANDRITZ focuses on the design of your electrical, controls, and instrumentation systems. We have the people, the patents, and the proven tools to ensure that your plant is operationally ready—so that when you press that "start" button in your plant . . . it actually starts.

Whether it's a greenfield or brownfield project, electrical, controls, and instrumentation typically account for a small portion of the total project budget—but their importance to the operation of a plant is paramount. All mechanical equipment must be "bolted down" before the electrical, controls, and instrumentation systems can be installed—by the time it is installed, most of the project budget has been spent and many owners assume that the plant will simply start up without incident or delay. But before you can start realizing a return on your investment, we ask you to consider these critical questions about your plant's control:

- Has your wiring been properly terminated?
- Have your motors been "bumped"?
- Has your I/O been checked back to your DCS/PLC/HMI?
- Are your control networks operational?
- Is your control system configured correctly?
- Is your operating and maintenance staff trained?

To put it simply: Are you ready? Will your plant start up—quickly, safely, and reliably? Are your operators trained to understand how to control your multimillion dollar processes? Is your equipment properly controlled to immediately start producing at nameplate capacity?

ANDRITZ will help you be ready. Our battery limit covers all electrical, controls and instrumentation, including:

- Substations, including the complicated and protracted negotiations with power utilities
- Power distribution, including harmonics and filtering
- MCCs
- DCS
- PLC/HMI
- Instrumentation
- Field cabling, including data networks, power, controls, and instrumentation
- Process data, in a form ready for import into your Enterprise Resource Planning system

ANDRITZ structures our scope of supply to fit your commercial needs, from engineering to engineering and equipment supply, to engineering, procurement, and construction.

As a division of a major multinational corporation, we have the purchasing power, resource pool, and local presence to undertake major projects, whether it's a

smelter in the middle of an urban industrial complex or a mining operation in the middle of the desert.

FIND OUT MORE:

The challenge: After all the design iterations, has the right equipment been ordered on time?

SYSTEMS, TOOLS, AND SERVICES

ANDRITZ recognizes that any capital project is an iterative process. The process engineers will take the first "cut" at the process, but will revise it based on the actual layout and equipment specified by the mechanical engineer.

As a result, the details required for power, instrumentation, and control are constantly in flux. Change management is a critical part of the project to ensure that the "right" equipment is specified, procured, and installed.

We help our customers navigate these rough waters with a team of experts who are supported by proven tools that help projects large and small start up quickly, safely, and reliably.

E&I SYSTEM DESIGN

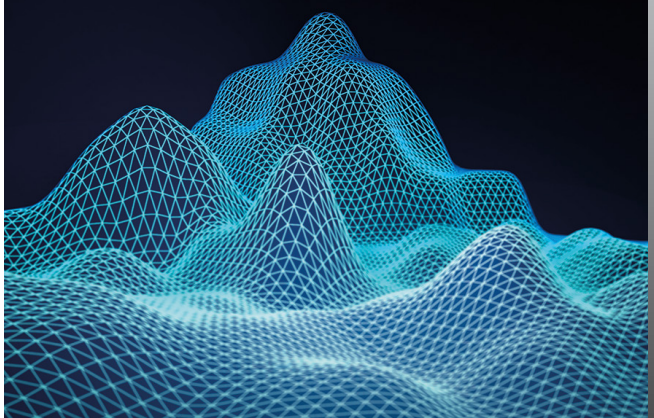
Our personnel use the principle of single point of entry for project data. Our connection to the IDEAS simulator ensures that process changes are addressed very early in the detailed design. Our design teams use database tools to control the data set as it grows and evolves. Whether it be a purchase order, an I/O list, or a drawing package, changes are highlighted as they are made by the process and mechanical engineers so that the correct MCC, cable, instrument, and I/O is provided for each piece of equipment. The result is a faster plant start-up at a lower capital cost.

SIMULATION

We utilize the highly successful IDEAS simulator in our design. IDEAS helps create a "virtual plant" environment in which process designs, modifications, and retrofits can be fine-tuned and verified, in faster than real time, before you commit to any capital costs. IDEAS can also be used to verify control logic, often catching hundreds of coding errors before the actual plant is started up. In addition, IDEAS is an excellent tool for operator training, enabling operators to practice critical procedures such as start-up and shutdown. This is especially important in greenfield projects where the operating staff will be new and not used to the process or controls. IDEAS has helped facilities around the world reach faster start-ups, producing first product and ramping up to nameplate production in record times.

Benefits

- IDEAS simulation helps verify process designs, test control logic, and train operators;
- Our design methodology helps ensure that the correct equipment is ordered and installation schedules are met.



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ENGINEERING SERVICES:

- System studies
- Feasibility studies and preliminary engineering
- Detail design
- Project management
- Commissioning and start-up
- Technical support and troubleshooting
- Operator training

ANDRITZ works in many continuous process industries. As a result, we have expertise in all the major controls platforms and power systems.

We choose the most appropriate equipment for your needs while recognizing your constraints of minimizing spare parts inventory and limited maintenance staff. Do you have a legacy system or a unique controls requirement? We likely have direct experience with that legacy system or have the creativity to provide a solution that meets your exact situation.

We know that your operation runs around the clock. As such, we offer remote support so that we can address issues, even if it's the middle of the night. At all of our customers' sites, we provide facilities for this remote access, but for your security, we configure it so that access is controlled solely by you, the customer.

At ANDRITZ, you will see the same team during preliminary engineering, detailed design, commissioning, and start-up. In fact, you will even see this team after start-up, helping you to implement your ongoing plant improvements.

SUCCESS STORY

One of our chlor-alkali customers had a legacy system to monitor the bus currents in an electrolytic process. The sensors used to measure the bus current were non-electrical contact, using the Hall effect of the bus. These sensors were no longer available or supported by the original manufacturer. ANDRITZ developed and supplied a replacement sensor that was compatible with the existing SCADA system.

"ANDRITZ's people are professional, knowledgeable, take pride in their work and do an excellent job from design through start-up."

BRYAN NIELSON
VP Production, US
Graymont

The challenge: Will I have sufficient, quality power connected to meet my schedule?

POWER SYSTEMS

ANDRITZ understands that one of your biggest operating costs is energy. That's why we strive to find the solution that best balances the requirements of your specific operation. We have extensive experience in all areas of industrial electrical systems for both greenfield projects and the expansion of existing facilities.

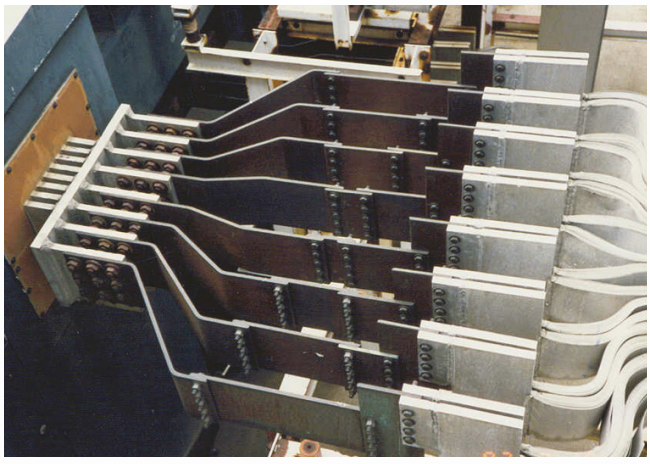
Process equipment is often considered to be the longest lead item—but with the quantity of major projects now being constructed worldwide, the major electrical items (such as substations and transformers) are now on the critical path. We are constantly in touch with suppliers and are current with the lead times of such equipment.

In addition, the negotiations with the power utility can have a critical influence on your schedule. ANDRITZ has the expertise and experience in working through the regulatory requirements of the power utility.

Our project experience encompasses substation design, power distribution systems and the application of drive systems. ANDRITZ's specialists are also renowned for the application of large rectifiers and the design of DC bus work, shorting switches, and harmonic filters.

Our skill in developing options and identifying solutions is particularly valuable in the modernization of operating facilities, where changeover risks must be successfully managed. We work with you to implement plans and procedures that minimize downtime and loss of income.

We have CYME and SKM power analysis tools and have experience with EDSA, PTI, and ETAP programs. We are experts in protective coordination, arc flash, load flow, harmonics, insulation coordination, reliability, motor starting, grounding, and short circuit studies.



Benefits

- Implement efficient energy consumption solutions;
- Expert electrical troubleshooting to quickly diagnose and resolve problems;
- Experts in all major power analysis tools.

We provide ongoing support and troubleshooting for our customers. Electrical problems in plants can be difficult to diagnose and resolve. Whether the problem is an intermittent ground fault, harmonic resonance, or poor voltage regulation, applying the right equipment is essential. Our engineers will select the appropriate power monitoring equipment to diagnose the problem and then work with operations to solve it.

ANDRITZ recognizes the importance of reliability and maintainability in the design of power and control systems. We have been employed by heavy industry and understand the necessity of providing clear, concise documentation to facilitate system maintenance and troubleshooting by your operations and maintenance staff.

SUCCESS STORY

ANDRITZ was hired by a plant to rectify an issue with the harmonic filters associated with the rectifiers for an electrolytic process. In short, one of the harmonic filters had completely melted. ANDRITZ's experts identified the failure mode as "even harmonic resonance."

This is a very unusual occurrence requiring sophisticated analytic skills to troubleshoot, but our understanding of power systems meant we could implement solutions in a new design to mitigate further harmonic problems.

"[ANDRITZ gave us] creative design and installation approaches . . . well-managed. . . in-plant procedures, policies and culture were understood, respected and supported . . . good planning and excellent communication with operating staff . . . smooth installation and start-up . . . I wish all projects went as smoothly as this one."

ERIC SYKES AND RALPH BRAUN
Rio Tinto Alcan Operations

The challenge: There is plenty of activity in my control room—why isn't my plant running?

CONTROLS AND AUTOMATION

Whether a new project, or an upgrade, there is nothing more important than achieving accurate control that actually operates the plant—the moment you press the start button. Otherwise, you experience substantial costs associated with delayed start-up and lost production.

Your operators must be trained on the control system prior to start-up. By completing the controls design early in the project, it can be coupled to the IDEAS process simulator to create comprehensive operator training. In this respect, ANDRITZ has revolutionized the capital project design methodology by having the control system tested and ready for use well before start-up.

No longer will your start-up be delayed because a control engineer is busy revising logic at the last minute. ANDRITZ has a dedicated controls group comprised of engineers, scientists, technologists and programmers with extensive process experience in the application of computer technology for industrial control and automation.

We are skilled in the selection, design, programming, integration, and commissioning of a wide range of control products and systems including:

- Smart devices
- Programmable logic controllers (PLC)
- PC-based soft PLCs
- Human-machine interfaces (HMI), including web-based HMIs using standard browsers over the internet/intranet
- Distributed control systems (DCS)
- Supervisory control and data acquisition (SCADA)
- Real-time high speed plant floor networks, including Ethernet TCP/IP
- Data historians and dedicated application servers
- Manufacturing execution systems (MES)

ANDRITZ offers the following services:

System studies: Control system evaluation, performance audits, troubleshooting existing plant control system, network security review, system reliability studies, housekeeping and disaster recovery procedures, drawing and documentation updates, software programming methodologies, and development of hardware standards.

Feasibility studies and preliminary engineering: Conceptual design, system hardware and software evaluation, network architecture definition, system performance studies, budget estimates, detail specification, and tender package preparation.

Benefits

- Exclusive use of IDEAS simulator means logic errors are identified and removed prior to start-up;
- Control and automation experts bring proven experience, covering everything from system studies to installation and troubleshooting.

Detail design: System design and configuration, control logic and operator interface programming, networking interface and integration, preparation of construction drawings, factory acceptance testing, and commissioning plans and documentation.

Project management: Plant control system expansion and upgrade logistics, transition and contingency planning, implementation program execution, procurement and expediting, and environmental and quality management.

Commissioning and start-up: Equipment commissioning and start-up, including construction supervision.

Technical support and troubleshooting: Post installation technical support and remote monitoring facilities.

Operator training: Customized training for operation and maintenance staff, including technology transfer.

SUCCESS STORY

When Freeport-McMoRan Copper & Gold needed to solve issues with the control configuration for its 850M USD Cerro Verde copper mine expansion in Peru, it brought in ANDRITZ.

Using the IDEAS simulator, the ANDRITZ team was able to test thousands of "typicals" in the simulated control logic, enabling them to verify and solve any issues months before the plant's actual start-up.

In addition to removing all critical logic errors, the ANDRITZ team was able to provide operator training through the IDEAS simulator, helping the plant to experience an improved start-up and achieve production targets faster.

"ANDRITZ engineers worked on the Cerro Verde Copper Concentrator DCS programming and configuration project in Arequipa, Peru. It was my pleasure to work with ANDRITZ engineers as they performed their work in a professional manner. I would highly recommend them on any DCS configuration project."

RON COOK, SUPERINTENDENT, PROCESS CONTROL
Freeport-McMoRan

The challenge: Why do I keep receiving change orders from my electrical contractor?

SYSTEMS, TOOLS, AND SERVICES

ANDRITZ knows the amount of detail that is required in the bid documents and specifications to a contractor so that you, the owner, obtain competitive proposals for the equipment supply and construction.

ANDRITZ has been modernizing operating industrial plants since 1965. As a result, we have addressed the challenges of documenting the routing of cabling and upgrading equipment in congested spaces, within the downtime constraints of an operating plant. We have grown from these roots and now engineer major greenfield projects.

Accurate, comprehensive documentation is basic to the successful management of the project design. Assigning control devices to process equipment during process design ensures the ability to control the process and reduces rework as equipment is ordered, wired, programmed, and started up.

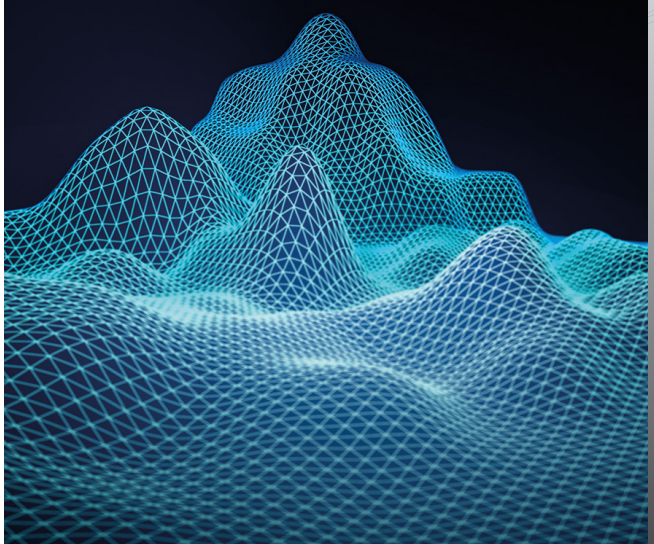
Creating an electrical construction package and good maintenance drawings is key to your plant's success. The construction drawings are tailored to installation contractors, showing them the information they need to wire the plant efficiently and economically. A good maintenance set is also required for operations, showing each piece of equipment and how it is connected and controlled.

Instrumentation, by its very nature, is very detailed and, together with the quantity of instruments in a modern plant, demands a comprehensive, well-organized system for change management. Our electrical and instrumentation work aligns with the overall project team's efforts, ensuring cohesiveness between the project disciplines and results in fewer interfaces between the project design groups, including civil, environmental, mechanical, and process design.

ANDRITZ defines electrical system capacity and utility requirements, establishes an equipment numbering system, works with process engineers to accurately assign control devices to process equipment, and produces effective E&I construction and maintenance packages.

Benefits

- Reduce rework during construction, as all equipment has been specified properly;
- Reduce change orders in electrical construction package;
- Enable faster start-up because hard-wired systems match control system and are installed correctly;
- Ensure operating plant has accurate E&I information during start-up and operation.



Our engineers and designers are typically involved in the project from concept through commissioning and on into operations support. Therefore, we have the practical experience with power, distribution, utilization, controls, instrumentation, automation, grounding, and lighting systems. Our electrical engineers are experts in power and energy management, substation design, distribution system plant electrical design and layout, and variable speed drives.

Drawing upon a wide range of resources that includes knowledgeable staff in the areas of chemistry, metallurgy, engineering (electrical and mechanical), software development, and management consulting, we offer a wide range of services including system studies, feasibility studies and preliminary engineering, detail design, project management, commissioning and start-up, technical support and troubleshooting, and operator training.

SUCCESS STORY

ANDRITZ was selected by Canfor Pulp for its 60 MW Green Power Cogeneration Plant in British Columbia, Canada.

The project included an evaporator upgrade, conversion of the recovery boiler to low odor, power boiler conversion, hog fuel handling, cooling tower, electrical upgrades, and a steam turbine generator.

We provided detailed design, procurement, vendor interfacing, construction supervision, and commissioning for the power system, electrical, instrumentation, and controls.

Our portion of the project was completed on budget and on schedule, helping the plant achieve operational capacity, as designed.

"Your leadership was valued and appreciated. These are the times when we truly value our relationship with ANDRITZ."

BRETT ROBINSON
Canfor Pulp

Metris
ANDRITZ Digital Solutions

AUTOMATION SOLUTIONS

Release your full potential

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