

Reliability and condition monitoring solutions for the steel/metal production industry



Why partner with Bently Nevada?

We have earned your trust. For six decades the Bently Nevada product line has supported the most demanding applications in multiple industries. And even as we protect and monitor your machinery, we constantly strive to refine and improve our offerings—and help enable your success.

We design and deliver solutions for all of your monitoring needs—including sensors, distributed and rack-based monitors, software, and supporting services—with the following goals:

- Increased availability and production
- Lowered maintenance costs
- Reduced risk in terms of safety, environmental, and asset upsets
- **Quantifiable, proven results:**
- Over 60 years of innovation in asset protection and condition monitoring
- More than 240 international patents issued, including over 150 in the U.S.
- More than 360 international patents pending, including over 95 in the U.S.
- Over 85,000 3500 Series monitoring systems installed globally
- Over 4 million sensor monitoring points
- Services support globally
- Over 1,600 System 1 software users worldwide

Industry challenges

Steel and other metals have had a major influence on our lives; the vehicles we drive, the buildings we work in, the bridges we travel over, the planes we fly along with countless other applications globally. Steel is a core part of society and producing the various steel products requires reliable and efficient operations to be competitive in the global marketplace. Consequently, a steel production operation's reliance upon its machinery has never been more important. Downtime is more expensive. Uptime is more valuable. Operators need to know if they can push machinery to its design capacity and beyond while remaining safe and maximizing the balance between useful life and capacity. And, as always, operators need to remain safe—for their families, for their communities, and for the environment.

Reliability: the key to a successful future

Unreliable assets have enormous consequences. What if your assets could consistently operate at or above their rated capacities, for a greater percentage of total hours each year, all while spending less money on maintenance? That's exactly what today's best companies have discovered how to do. Industry studies show that the average facility spends approximately 5% of its Replacement Asset Value (RAV) on maintenance each year. In comparison, best performers spend 60% less—just 2% of RAV—while enjoying better uptime, efficiency, and profitability. It's not about simply spending less on maintenance, it's about working differently—working smarter—to achieve more reliable steel production operations.

Benefits with Bently Nevada

Closing the gap between your reliability "goals" and what you are actually obtaining from your efforts typically involves the following three categories:

- **Processes:** Our comprehensive services help customers assess their goals, identify the reliability gaps in their current operations, and then implement the appropriate corrective actions.
- **Tools:** Our Bently Nevada product line is world-renowned for unsurpassed quality in rotating machinery condition

monitoring. Everything needed to address the assets in automotive plants and other metal production facilities are available, from sensors to continuous monitoring systems to portable data collectors and analyzers. And, it's all brought together in a unified platform for asset condition monitoring and diagnostics—Bently Nevada's System 1* software. We also assist customers in integrating and using their already installed tools, such as computerized maintenance management systems (CMMS) and reliability software.

- **People:** Reliability is about more than just technologies and processes. Armed with even the most sophisticated tools and effective strategies, companies can fail to reach their reliability goals unless they are able to successfully change the way they work. Reliability is a company-wide effort that touches operations, maintenance, planning and scheduling, purchasing, management, and engineering. Bently Nevada is able to help customers change the way they work by addressing the organizational culture issues that keep companies mired in ineffective processes, helping them transform their businesses and balance sheets.

Because Bently Nevada is able to fully address each one of these, we are able to solve the whole problem—not just bits and pieces.

Condition monitoring

While condition monitoring may not be the only element in a successful reliability program, it is nonetheless an essential element. For years, we've been taught that the older an asset is, the more likely it will fail. As such, many plants have evolved elaborate and finely tuned maintenance schedules based on calendar intervals or running hours.

There's just one problem with that approach: time- or usage-based maintenance strategies alone are only valid for 10 to 15% of the assets in a typical industrial facility.

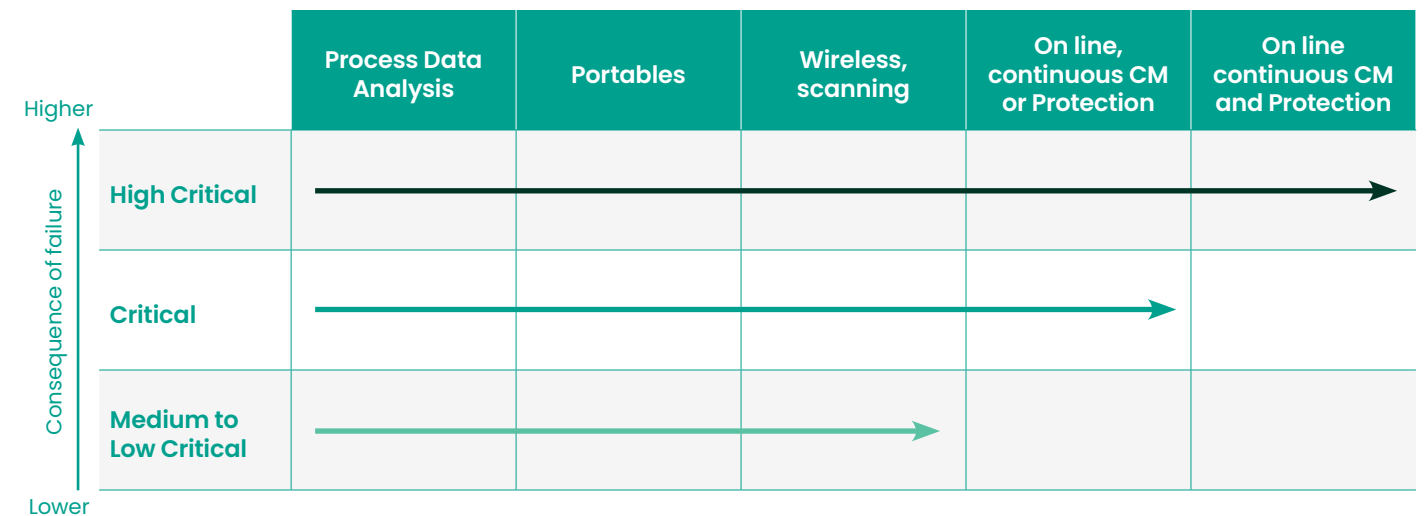
In other words, if you have applied a time or usage based only maintenance strategy to the majority of your equipment, most are getting "maintained" when they don't need to be. That's wasteful, and it's one of the major reasons that many companies are overspending on maintenance. In other cases, the asset may fail before it reaches its scheduled maintenance interval. Frustrated, plant maintenance staffs are left to wonder "what went wrong."

Different assets, different approaches

Not all assets are created equal. In the automotive industry; ventilation fans, robots, chillers, cooling tower fans, conveyors and cranes are highly critical to operations. Other assets are less critical. And still others have little impact on safety, environment or production, with only maintenance costs as the primary consideration. As such, a variety of condition monitoring products and approaches are required.

Today we understand that the probability of an asset failure is often highest just after it has been placed in service (or undergone maintenance). Following this "infant mortality" period, its probability of failure becomes constant and does not rise linearly over time. This means that running hours and calendars are poor "predictors" of failure. How do you know when such assets will fail if the time-based intervals can't be trusted? By measuring the mechanical condition of the asset – vibration, temperature, efficiency, oil chemistry/ particulates, and other physical parameters. In other words, condition monitoring.

This approach results in maintenance only when the condition indicates the asset is failing. Further, failure progression can often be trended quite accurately, allowing maintenance intervention at exactly the right time—not too soon, not too late. And, condition data can be remarkably precise, indicating not just that the asset is failing, but exactly what is wrong, providing vital input to a root cause investigation that can help to prevent a similar failure in the future.



Bently Nevada service menu

Key benefits

Implementation services

Get it right the 1st time

- Ensure your assets are protected and monitored when you're ready to startup
- Avoid costly delays and rework
- One source to design, plan, manage, and execute the installation
- Avoid startup trips due to improper installation and configuration

Up to \$1M/day

Avoided cost from lost production, secondary process & equipment damage

100%

Service work guarantee
1 year warranty standard on all service work

Proactive support

Keep your system healthy and optimized

- Prevent instrumentation related false trips
- Prevent and minimize potential data loss events
- Keep up to date and compliant with the best technologies available
- Access the expert support you need when you need it most

80%

Industry wide machinery alarms & events are due to instrumentation

>90%

Typical reduction in non-actionable alarms & events

Asset health and consulting

Actionable insights you can trust

- Understand your asset health to optimize outage and maintenance planning
- Plug in to our global network of machinery experts with remote monitoring
- Professional OEM agnostic machinery diagnostics when and where you need it
- Custom analytic development and tuning to pinpoint specific conditions

100% ROI

A single machine save often results in complete monitoring contract payback and more

5-10X

Cost reduction for well planned maintenance outage vs unplanned reactive outage

Cybersecurity¹

Stay ahead of evolving cyber threats

- Ensure your system is up to date and protected as threats continually evolve
- Identify and mitigate cybersecurity risks to your operation
- Keep your system both secure and accessible with advanced security technologies and architectures leveraging data diodes and database replication

29%

Patch management can reduce your attack surface up to 29%

243 days

Average time before detection that a system is compromised

Training and education

Critical skills that amplify your machinery management capabilities

- Enable your personnel to operate and maintain your monitoring and protection system
- Enable your operation to maximize the value of your system leveraging expert product and application training and knowledge

400+

Customer courses delivered each year in 10 languages and over 45 global locations



You can rely on us

For more than 50 years, we've been supplying condition monitoring solutions to machinery-intensive industries. We also bring two decades of experience conducting reliability improvement projects. Customers turn to us for a simple reason: lasting value. Our solutions demonstrate their worth, day in and day out. We combine the highest quality products and responsive customer support with a service team that takes the time to understand the uniqueness of your plant, your personnel, and your goals.

Our products can be found in many of the steel and metal production facilities globally, often supplied as standard by the OEM on highly critical equipment such as motors, pumps, mill stands, cooling tower fans and power production assets. Today, many of those same plants are turning to Bently Nevada for a more comprehensive solution to their needs, moving beyond just machinery protection instrumentation on a few assets to plant-wide strategies and systems for improved environmental compliance, safety, asset production, quality and reduced operation and maintenance costs.

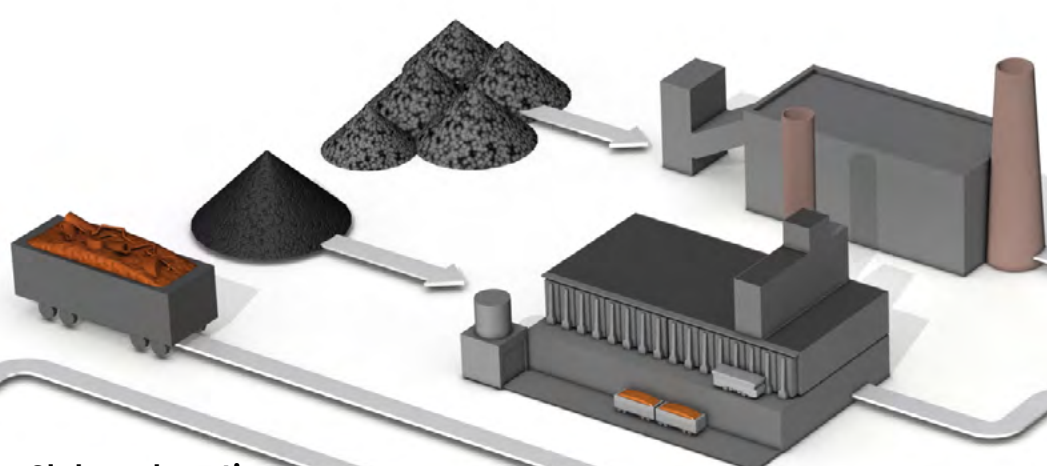


¹ https://www.us-cert.gov/sites/default/files/documents/Seven%20Steps%20to%20Effectively%20Defend%20Industrial%20Control%20Systems_S508C.pdf

Typical integrated steel/metal manufacturing plant process

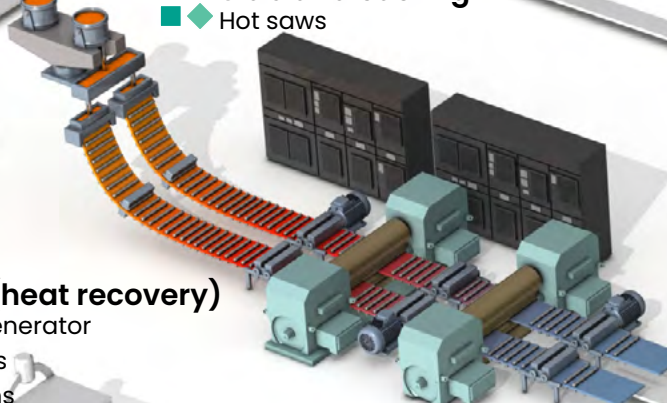
Sinter and coke plants

- ◆ Waste gas fan
- ◆ Cooling fans
- ◆ Denox
- ◆ Combustion air fan
- ◆ Hot air fan
- ◆ Dedusting fan
- ◆ Coke oven fan
- ◆ Gas booster fan
- Coke oven by-product compressor



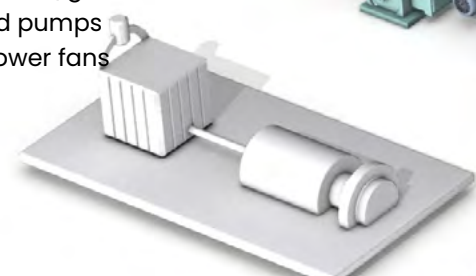
Slab and casting

- ◆ Hot saws



Power island (heat recovery)

- Steam turbine/generator
- Boiler feed pumps
- ◆ Cooling tower fans



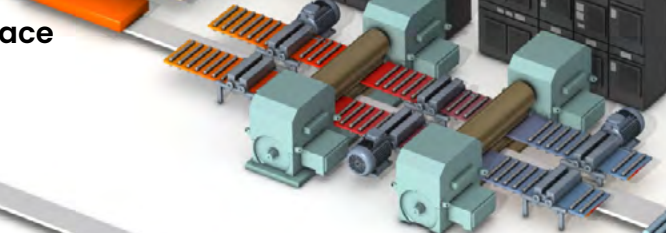
Reheat furnace

- ◆ Fans



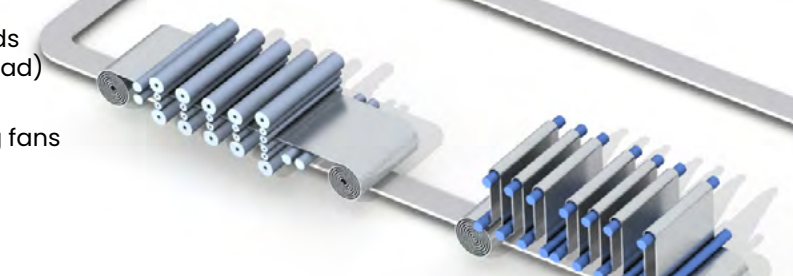
Hot strip mill

- ◆ Rolling mill stands
- ◆ Process cooling pumps
- ◆ Extraction & cooling fans
- ◆ Saws



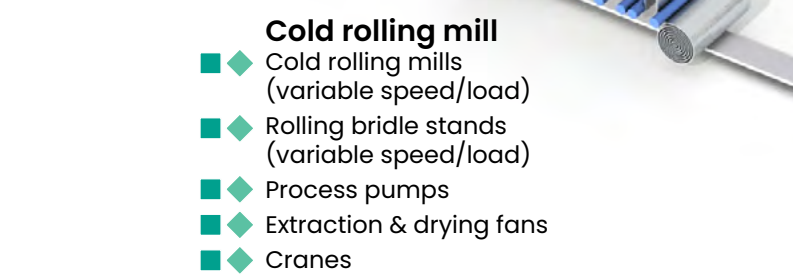
Pickling lines

- ◆ Rolling bridle stands (variable speed/load)
- ◆ Process pumps
- ◆ Extraction & drying fans
- ◆ Cranes



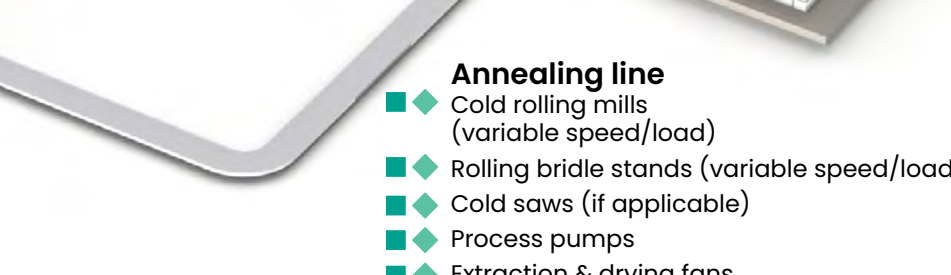
Cold rolling mill

- ◆ Cold rolling mills (variable speed/load)
- ◆ Rolling bridle stands (variable speed/load)
- ◆ Process pumps
- ◆ Extraction & drying fans
- ◆ Cranes



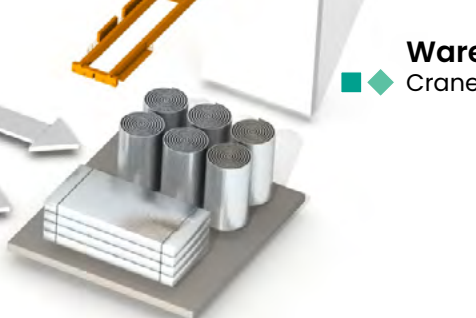
Annealing line

- ◆ Cold rolling mills (variable speed/load)
- ◆ Rolling bridle stands (variable speed/load)
- ◆ Cold saws (if applicable)
- ◆ Process pumps
- ◆ Extraction & drying fans
- ◆ Cranes



Warehouse/storage

- ◆ Cranes



- ## Blast furnace
- ◆ Extraction & cooling fans
 - ◆ Conveyor



- ## Oxygen furnace
- ◆ Process fans



Arc furnace

- ◆ Fans



Metallurgic drum Vacuum degassing



● Continuous on line monitoring

Orbit 60 3500 Series 2300 ADAPT 3701/40 1900/65A AnomAlert

■ Surveillance on line monitoring

vbonline Pro and Ranger Pro

◆ Off line route based portable data collection

SCOUT 100, VBx series and COMMTEST/SCOUT 220/240

System 1 – one platform, endless possibilities

Improve equipment reliability, uptime and efficiency

System 1 represents Bently Nevada's flagship condition monitoring solution that seamlessly integrates with our industry leading products including online and portable devices. System 1 provides scalability by adapting to the condition monitoring requirements at your facility, as well as flexibility by connecting to any Bently Nevada's field devices.

