How AI Unlocks the Steel Industry's Full Potential

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Steel companies are facing a myriad of challenges today, such as an aging workforce, complex processes and increasing pressure to decarbonize operations to meet climate goals - only exacerbated by a global pandemic. While the sector contributes about 3.8% to the global GDP and generates employment for about 96 million people through direct and indirect channels, steelmakers are increasingly looking to increase efficiency and reduce carbon emissions to improve their business valuation and environmental footprint. In fact, the global steel sector may find approximately 14% of steel companies' potential value is at risk if they cannot reduce their environmental impact.

With increasing focus on digitization and the advent of AI and ML, only those companies who are successfully able to realign priorities to meet evolving industry needs will be able to flourish and gain a competitive edge. A survey of 50 steel companies conducted by McKinsey revealed that 82% of metals players see digital initiatives as the top priority in their business strategy[1]. Furthermore, it indicated that although the majority of steel companies have already rolled out digital and analytics programs over the past few years and started to generate impact, a lot of potential remains untapped. The key reason for this is understood to be a shortage of talent to drive digital transformation strategies and limited infrastructural capabilities to support technology development.

[1] https://www.mckinsey.com/industries/metals-and-mining/our-insights/how-digital-and-analytics-can-unlock-full-potential-in-steel
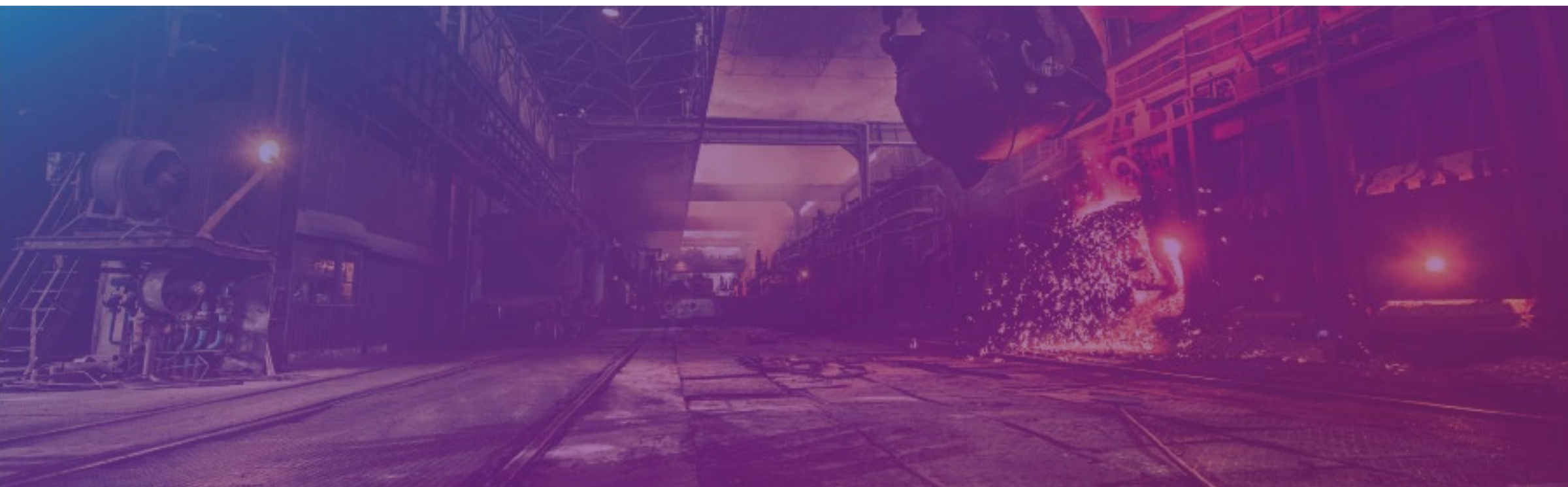
AI AND ML CAN BRIDGE THE GAP

However, the advent of technologies like AI and ML have made it possible for engineers and industrial operators to harness the full potential of digitization, without requiring any coding experience. The Canvass AI platform, for instance, puts the power of AI in the hands of engineers, omitting the need for specialized technical talent. The no-code platform allows operators to analyze massive amounts of data in real-time that not only aids in decision making but also provides predictive insights that can lead to significant cost savings.

In the steel sector, AI can enable industrials to optimize processes and assets, lower energy consumption, increase yield and improve product quality. It can revolutionize the entire production line, making it highly efficient by optimizing energy and enabling the use of alternate fuels, optimizing steam demand, and building predictive maintenance capabilities. Steelmakers are reaping the rewards of AI today by using it to help predict ladle temperature in the delivery system, facilitate slab cast quality prediction, predict mechanical properties, and reduce variability in the hot and cold rolling processes.
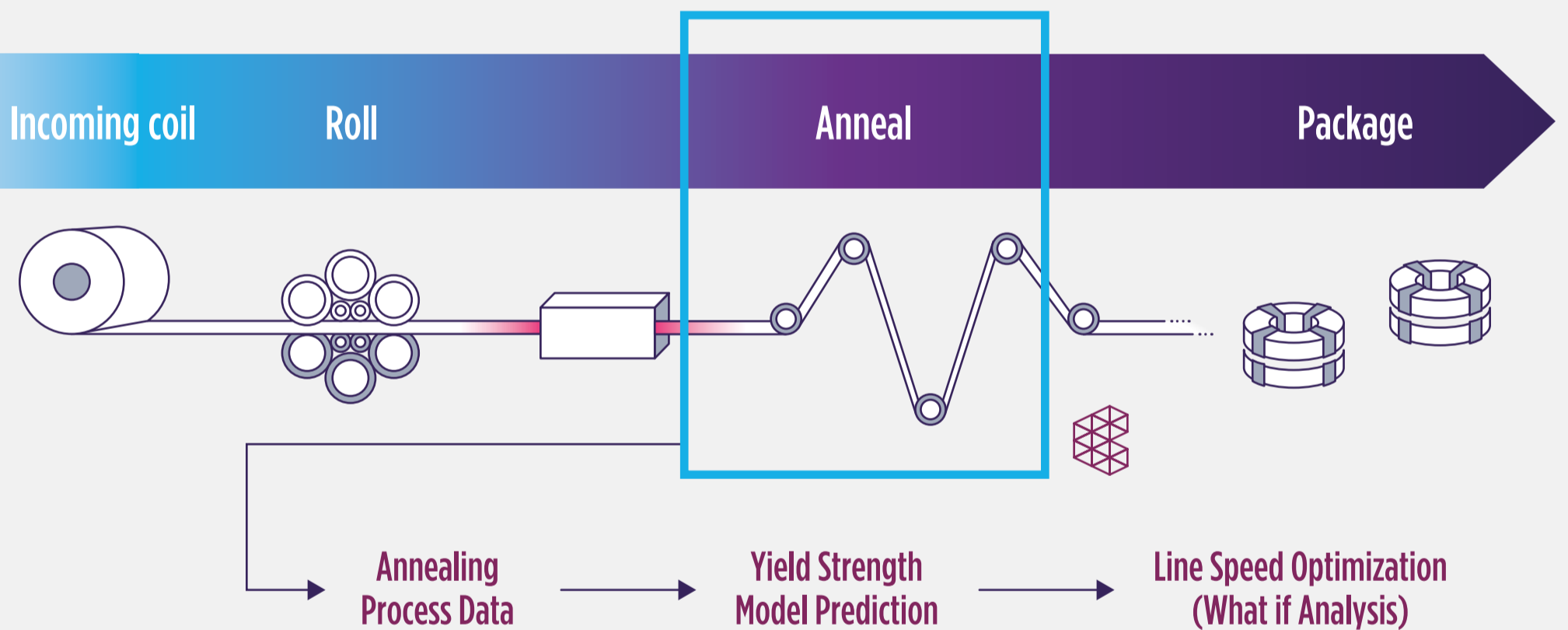
Top AI Use Cases in Steel

- Predict ladle temperature in the delivery system

- Facilitate slab cast quality prediction

- Predict mechanical properties

- Reduce variability in the hot and cold rolling processes

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BLUEPRINT FOR EFFECTIVE AI DEPLOYMENT IN STEEL PLANTS

Steelmakers can effectively implement AI to project optimal throughput speed for common steel-making processes, such as annealing, to maximize production, while maintaining quality and increasing yield.

Let's understand this better with the help of a use case. A North American steel manufacturer used the Canvass AI platform to increase line throughput, while maintaining product quality.

| Incoming coil | Roll | Anneal | Package |

Annealing Process Data → **Yield Strength Model Prediction** → **Line Speed Optimization (What if Analysis)**

This manufacturer caters to a wide range of industries such as aerospace, automotive, construction, defense, energy, infrastructure, and mining, among others.

The steel manufacturer wanted to apply AI and ML to its annealing process. This process essentially heats and cools down steel coils at set points at different stages. This is expected to affect the material's crystalline structure, thereby improving its mechanical properties and increasing strength. Once this is done, samples are taken manually from each lot to measure their properties.
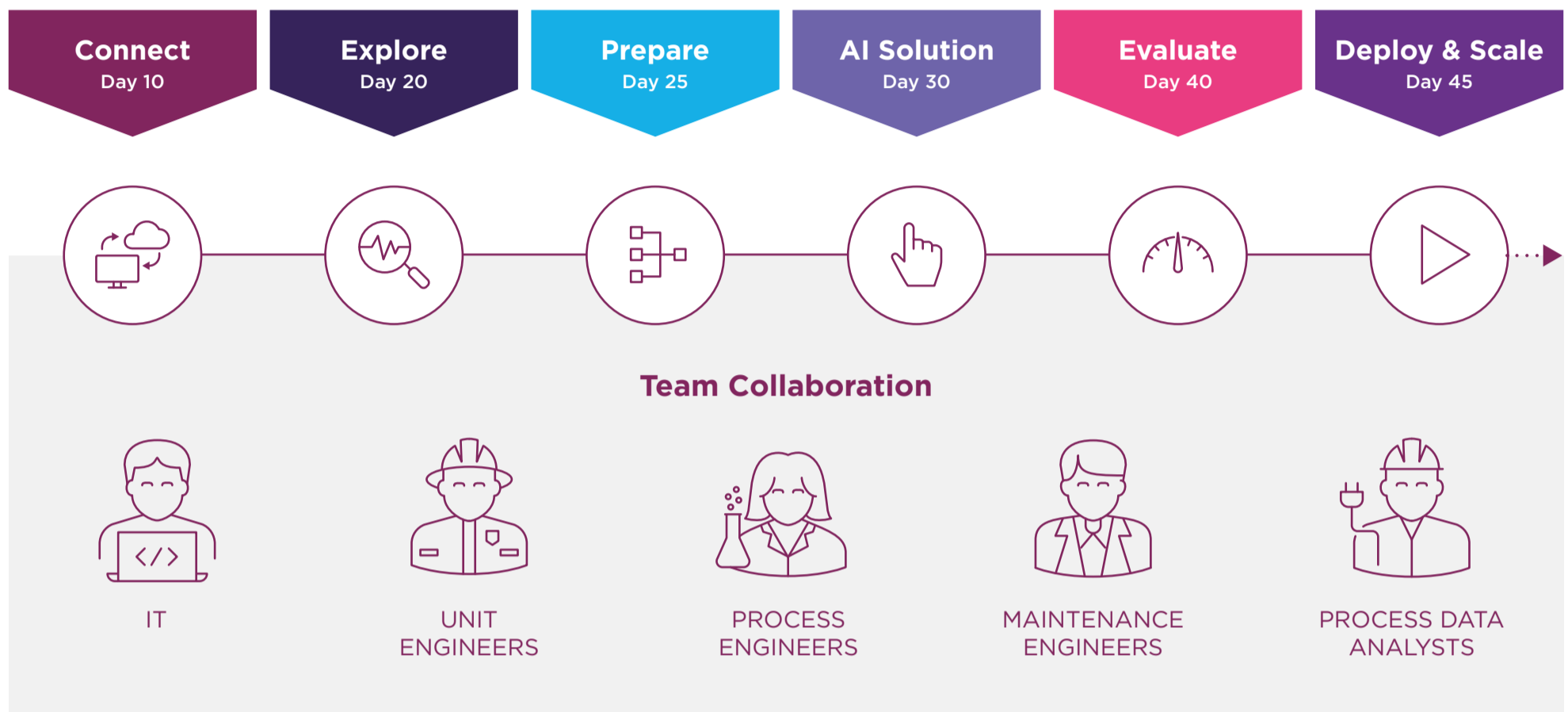
This testing is a time-consuming process and presents an ideal use case to apply AI. The Canvass AI platform helped the company analyze historical data of the annealing process and predict quality of the product, essentially eliminating the manual testing process. Moreover, it also helped engineers to proactively control the quality and function.

Canvass's AI platform was also applied to help the company boost line speed by over 11% without impacting the quality of the final product. This, in effect, allowed them to increase yield by more than 9%. What is even more impressive is that this manufacturer was able to scale the Canvass AI solution and learnings to eight other processes in less than a week.

A major steel manufacturer wanted to increase line throughput while maintaining product quality. By utilizing the Canvass AI platform, the company has:

- Boosted line speed by over **11%**

- Increased yield by more than **9%**

- Scaled the solution to **8** other processes

- End-to-end implementation in **< 45** business days

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THE CANVASS AI PLATFORM JOURNEY

Connect Day 10	Explore Day 20	Prepare Day 25	AI Solution Day 30	Evaluate Day 40	Deploy & Scale Day 45

Team Collaboration

IT	UNIT ENGINEERS	PROCESS ENGINEERS	MAINTENANCE ENGINEERS	PROCESS DATA ANALYSTS

Canvass AI gives steel manufacturers all the capabilities they need to deploy AI to build efficiencies, reduce costs and significantly improve yield. The Canvass AI journey comprises of the following steps:

○ **Set clear objectives:** It is imperative that industrials understand their ultimate goal of leveraging AI. It can be enhancing the life of assets, increasing yield or optimizing overall efficiency. Then the team can build a framework that will help them achieve this goal.

○ **Get your data ready:** As AI is data-dependent, the first step of any AI journey is to assess data readiness. You can do this by analyzing data, learning from it and extracting actionable insights. The data needs to be relevant, multifaceted and must include large quantities of historical as well as real-time data. The quality and depth of the data will determine the level of AI integration you can achieve.

○ **Identify the right use case:** Identifying the right use case sets the ball rolling for a successful AI rollout. It helps you demonstrate viability, obtain buy-in, and create favourable conditions for scaling.

A successful use case is one that helps you demonstrate clear value, has sufficient and relevant data to work with, augments your existing process or asset, demonstrates tangible results, and is scalable to other processes.

- **Start small:** As more and more industrial companies ramp up their digital investments, it is imperative to start small – with one asset or one work stream and then apply that understanding on a large scale.

- **Architect enterprise scalability:** Architect enterprise scalability of the AI use case around the learnings and success. This will allow you to test your people, processes and technology and prepare you to scale-up across the enterprise. Industrials need to build their process this way so that they can test, learn from it, roll out the framework, scale it and then take it enterprise-wide. People, processes and tools must all come together to achieve the end goal.

With Canvass's AI platform, steelmakers can easily and quickly leverage AI to optimize their operations and increase production. A case in point is the North American steel manufacturer, which could complete end-to-end implementation in just 45 business days. AI and ML are central to the steel industry's digital transformation, and Canvass's no-code AI platform, built for industrials, can help you gain a crucial competitive edge by enabling you to improve yield and enhance efficiency.