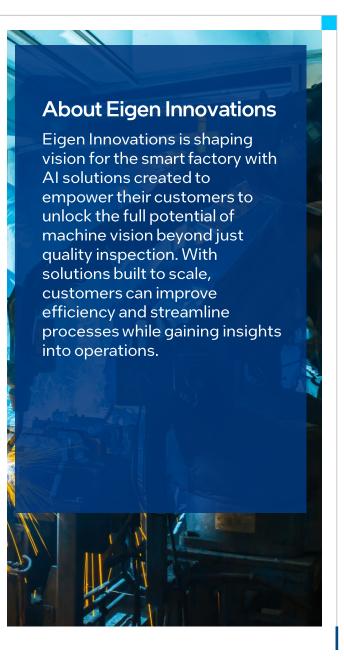## Case Study

Asset & Operations Optimization
Situational Monitoring

Henderson Stamping Optimizes their Manufacturing Operations and Improves Quality Control with Eigen Innovations and Intel Technology

Eigen Innovations is helping metal stamping manufacturer Henderson Stamping improve their yield, prevent product recalls, and reduce their cost of quality with the OneView Machine Vision solution.

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About Eigen Innovations

Eigen Innovations is shaping vision for the smart factory with AI solutions created to empower their customers to unlock the full potential of machine vision beyond just quality inspection. With solutions built to scale, customers can improve efficiency and streamline processes while gaining insights into operations.

The Imperative for Manufacturing Solutions

In today's manufacturing landscape, companies are facing a complex set of interconnected challenges, including escalating product costs, supply chain disruptions, and significant labor shortages. Manufacturers are tasked with finding a delicate balance between maintaining stringent quality standards, increasing customer expectations, and high production rates, while keeping costs down and improving productivity. Any defect found on the factory floor, or worse—discovered by a customer after receipt, can lead to costly impacts on a manufacturer's bottom line through machine downtime, tardy deliveries, and tarnished brand reputation.

Ensuring timely and accurate quality inspections becomes essential to upholding smooth operations and safeguarding ROI. Manufacturers like Henderson Stamping are searching for innovative AI-powered solutions that can help streamline visual inspection, quality control, and traceability to stay ahead of the curve and thrive in a demanding manufacturing environment.

The Henderson Stamping Challenge

Henderson Stamping, a manufacturing company specializing in appliance and automotive metal stamping, converts metal sheets into a variety of specific shapes. With twenty production lines and six manual inspection points, Henderson Stamping's processes are undeniably complicated. High quality production is an integral part of Henderson Stamping's operations, as many of their customers have extremely stringent quality standards. Driven by their commitment to continually provide their customers with the highest standards, Henderson Stamping sought a solution to address their primary operational challenges.

The primary challenges Henderson Stamping was looking to address were improving inspection accuracy, achieving production efficiencies, increasing defect mitigation, and enhancing data analysis.

1 **Inaccurate, Inconsistent Inspection:** Henderson Stamping relied on manual inspection processes. Manual inspection is inherently error prone in manufacturing, with an industry standard of only 80% accuracy in correctly rejecting manufactured parts due to human operator error.[1] Inspectors extracted ad hoc samples from the line to inspect for dents or nicks and remove defective components as they were identified. Quality of production was highly dependent on the quality of work performed by individual employees, which can lead to variability in accuracy between operators. In addition, factors like inspection fatigue, the minute nature of certain defects undetectable by the human eye alone, and environmental conditions such as lighting compound manual production challenges, leading to inconsistent quality control.

2 **Inefficient, Costly Production:** In addition to accuracy concerns, manual labor can be inefficient. Manuel inspection requires significant skilled labor that contributes to increased costs and wastes valuable employee time and resources that could be more effectively employed elsewhere. Compounding this issue is the current labor shortage–with 622,000 total manufacturing job openings yet to be filled.[2] This global talent shortage could further slow inspection processes and cause quality control challenges if skilled inspectors are limited and overloaded.

3 **Inadequate Defect Mitigation:** When defects occur, it can result in significant costs for Henderson Stamping. Rigorous industry standards mean defective components can lead to wasted batches and strained customer relationships.

4 **Insufficient Data Analysis:** Manual inspection provides limited data on production issues, making it difficult to source and trace defects as they occur on the line. It also limits insights that can help provide a holistic, deeper understanding of production for Henderson Stamping, including challenges in timely trend identification, process optimization, prioritization of risk areas, and production innovation. Without a quick understanding of where defects were occurring, Henderson Stamping was forced to be reactive to quality issues, sometimes not catching defective products until they were already in customer hands. And without a path to proactively identify and prevent issues before they occurred, Henderson Stamping risked significant and expensive product waste.

Henderson Stamping sought a streamlined and economical solution to ensure consistent, high-quality standards of production while retaining a competitive edge in the market. They recognized the need for an advanced vision solution and needed a partner they could collaborate with to improve operations. That's where Eigen Innovations stepped in, offering a partnership and their OneView machine vision solution.

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The Solution: Eigen Innovations OneView Machine Vision Technology

Eigen Innovations creates industrial solutions to unlock the full potential of machine vision beyond quality inspection. By utilizing machine vision and AI, Eigen Innovations helps customers turn data into process intelligence for traceability on production parts and enables users to anticipate issues before they occur.

With their complex production line processes, Henderson Stamping sought a scalable and flexible solution that provided a comprehensive view into their operations. Eigen Innovations was up to the challenge, offering a collaborative partnership and their OneView solution. Their suite of services and tools helps unlock the value of image and process data to reduce or eliminate product variability across machines, lines, and factories, empowering customers like Henderson Stamping to provide improved, more consistent defect detection and overall production optimization.

Henderson Stamping and Eigen Innovations began the process by having an open conversation about Henderson Stamping's current operations.

Initial Discussions: Eigen Innovations brought together experts from both companies to understand Henderson Stamping's current challenges, state of operations, and the key outcomes they were aiming to achieve.

Sample Testing: After these initial discussions, Eigen Innovations created a sample testing site on the factory floor to implement their OneView solution and establish a baseline. They installed an inspection booth with controlled lighting, cameras, and sensors to pinpoint defects on products as they traveled through the factory line. The OneView solution utilized machine vision to display defects clearly with a black and white snapshot, denoting defects as dark spots and making it easy to identify and pull components from the line.

Implementation: With promising results from the sample testing, Eigen Innovations worked with Henderson Stamping to upgrade their infrastructure and implement the solution on the factory floor with their sample testing data serving as a baseline. Eigen Innovations leveraged Intel® Core™ processors and the OpenVINO™ toolkit to enhance OneView's edge processing capabilities and to help optimize performance of machine learning models that alert operators to potential defects. Using the data collected in the OneView dashboard, they met weekly to review insights and adjust the solution as needed.

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The Impact

Eigen Innovations' collaborative approach and customization enabled them to provide a tailored solution that empowered Henderson Stamping to:

Enhance Defect Detection and Mitigation: OneView enables production line workers to more consistently detect issues on the line, from small slivers to large dents. The system's ability to create accurate readings allows Henderson Stamping to adhere to the strict production guidelines of their customers. With continuous learning validated by inspectors, OneView is expected to enhance its performance over time according to previous data, reducing false alarms and increasing accuracy so Henderson Stamping can mitigate defects to the greatest extent possible.

Improve Operational Efficiency: By merging image and process data streams to connect the dots between drifts in product quality and changes in process parameters, Henderson Stamping can pinpoint core production line issues. This has enabled Henderson Stamping to shift from simple detection to preventing issues before they escalate. Multi-camera operations allow for complex inspection processes without sacrificing efficiency. With the included dashboard, Henderson Stamping can access actionable insights for continued production improvement.

Improve Customer Satisfaction and Quality Assurance: Henderson Stamping estimates that OneView reduced their defect rates from approximately 10-15% down to 5-8%.[3] By releasing fewer defects to customers and increasing traceability down to the minute of defect occurrence, Henderson Stamping is able to maintain positive relationships as a supplier and reduce costs associated with returned components.

> " I was hopeful that this solution could positively impact our company, but OneView surpassed all expectations. We had a unique situation that required a collaborative effort, and Eigen Innovations stepped up as a reliable partner to establish the consistency we needed. The flexibility of the technology combined with the accessible interface has made OneView indispensable to our processes."
>
> **— Brandon McPeake, Business Process Specialist at Henderson Stamping**

Continued Collaboration

Henderson Stamping is committed to ongoing operational optimization, remaining in close collaboration with Eigen Innovations to extend the solution throughout the factory floor. In the next phase of their engagement, Henderson Stamping is working towards implementing the vision technology even further back on the line to detect anomalies before the molding process. Together, they aim to leverage OneView throughout the factory for seamless operations and high-quality output across all stages of production.

3. Estimations made by Eigen Innovations and Henderson Stamping. Intel does not control or audit third-party data. You should consult other sources to evaluate accuracy.

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Optimizing Performance with Intel Technology

Intel technology plays a pivotal role in optimizing the performance of OneView. By utilizing Intel® Core™ processors, OneView benefits from the cost advantage of advanced Intel® architecture without sacrificing performance. Unlike expensive GPUs, Intel Core processors offer OneView a cost-effective solution that meets their requirements for price, power, and performance. Seated in fanless, ruggedized industrial gateways, these processors deliver powerful compute capabilities and are a versatile option for harsh manufacturing environments. Intel® hardware enables OneView to use advanced image capture and control lighting, helping ensure flexibility and power in data analysis both at the edge and in the cloud for optimal results.

Eigen Innovations' machine vision solution utilizes edge devices powered by Intel® processors and optimized with the OpenVINO™ toolkit to ingest image data from camera sensors and process data from machines and programmable logic controllers (PLCs). The OpenVINO toolkit is designed to optimize machine vision technology by accelerating AI inferencing to support near real-time alerts while maintaining accuracy. This capability supports Eigen Innovations in consistently meeting aggressive production timelines. Additionally, the OpenVINO toolkit reduces model footprint to optimize hardware utilization. This enables users to maximize the value of their existing infrastructure and facilitate seamless deployment across various Intel hardware and environments—including on-premises, on-device, and in the cloud.

Learn More

Get started with Eigen Innovations' OneView, see here for details: Eigen Innovations | OneView Industrial Machine Vision

To learn about Intel® technologies visit:

- Intel® Core™ Processors Product Page
- Intel® OpenVINO™ Toolkit Product Page

About Henderson Stamping

Henderson Stamping is an international stamping supplier that specializes in appliance and automotive metal molding. Top industries rely on the Henderson Stamping plant for powder coating and medium- to high-volume stampings. Combining thirty-five years of knowledge and experience, Henderson Stamping offers dependable service to some of America's most well-known brands.

Accelerated by Intel® offerings take advantage of at least one Intel® technology, such as built-in accelerators, specialized software libraries, optimization tools, and others, to give you the best experience possible on Intel® hardware.

With Intel technologies and capabilities, a vendor's optimized offering can go beyond the traditional compute and extend to accelerated networking, storage, edge, and cloud. It's all part of helping customers build an optimized infrastructure across the company.

Sources

1. "Artificial Intelligence-Based Smart Quality Inspection for Manufacturing", NCBI, 2023.
2. "Understanding America's Labor Shortage: The Most Impacted Industries", US Chamber of Commerce, 2024.

Notices & Disclaimers