



MANUFACTURING QUALITY MYSTERY SOLVED

How RIOT Industrial's NextStep Module uncovered hidden patterns.

The Mystery on the Production Floor

A global manufacturer was facing a significant financial drain, losing an estimated \$180,000 annually due to inexplicable product failures in their batches. The problem escalated dramatically in late 2025, when three separate batches failed quality control within a mere 96-hour period. Each failure represented a direct loss of \$2,000. The operations team meticulously reviewed every operational parameter: temperature, pressure, and rotational speeds (RPMs). Against all expectations, all systems appeared to be functioning within normal ranges, yet the product consistently failed to meet quality standards.

When Traditional Methods Failed

In a desperate attempt to identify the root cause, the team embarked on a rigorous comparison of data logs from both successful and failed production runs. They were searching for the proverbial 'smoking gun' – any deviation that could explain the failures. However, their extensive analysis yielded no definitive answers. Average temperatures across the batches were virtually identical, and no system alarms were triggered. There were no discernible anomalous events. The team was left with a frustrating cycle of scrapping failed batches and hoping, with each subsequent run, that the quality issues would mysteriously resolve themselves.

The AI Challenge

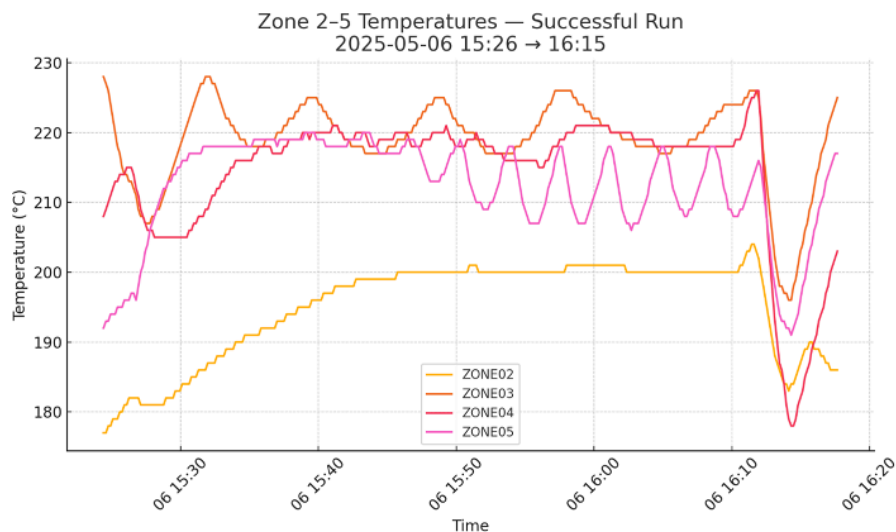
Identifying subtle, invisible patterns within a colossal dataset of 6.9 million data points is akin to searching for a needle in a haystack, blindfolded. Standard Artificial Intelligence (AI) systems often falter in such scenarios, particularly without well-defined baseline parameters. This lack of context forces them to operate on guesswork, leading to a high probability of false positives, missed critical faults, and ultimately, dead ends. The complexity of the manufacturing environment, with its myriad interconnected variables, presented a formidable challenge.

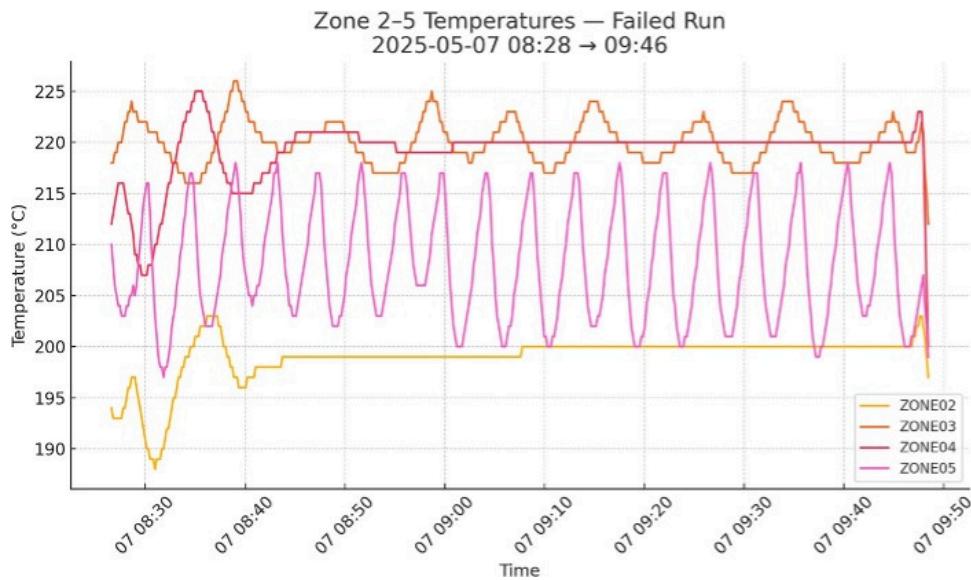
Enter RIOT Industrial

RIOT Industrial's [NextStep Decision Engine](#) module offered a fundamentally different approach. Unlike conventional AI solutions, RIOT's system could be 'educated' on the specific context of the manufacturing data. This allowed it to understand not just the numerical values, but their critical meaning within the physical realities of the production process. A significant advantage was the elimination of the need for any new hardware installation or operational interruptions. RIOT's NextStep module worked seamlessly with the company's existing Ignition historian, leveraging its advanced capabilities to uncover the hidden issues.

The Hidden Pattern Emerges

Diving deep into the millions of data points, the AI began to discern a subtle yet critical pattern that had eluded human analysis: minute but significant temperature instabilities. While the average temperatures appeared normal, a closer examination of the failed batches revealed a starkly different reality. Peak temperatures were recorded as spiking 5-7°C higher (reaching 224-227°C compared to the acceptable range under 222°C). Furthermore, Zone 5 of the machinery exhibited wild oscillations, swinging by 8 degrees instead of the usual, stable 4-degree range.





Key Findings from RIOT AI:

- **Peak Temperature Spikes:** Failed batches consistently exceeded 223°C.
- **Zone 5 Instability:** Temperature fluctuations in Zone 5 were double the acceptable variance.
- **Torque Variations:** Subtle increases in torque indicated overcooking of the product melt.

The Breakthrough Moment

Successful production runs were characterized by cooler operating temperatures and remarkably tighter, synchronized control across all zones, particularly in Zone 5. In stark contrast, the failed runs displayed erratic thermal behavior, strongly indicating issues with unstable heater control. The AI's sophisticated analysis even detected minute increases in torque, a tell-tale sign that the product melt was being overcooked, leading to its failure to meet quality specifications. The invisible had finally become visible.

From Mystery to Solution

Empowered with these precise, AI-driven insights, the manufacturer possessed a clear and actionable roadmap to address the quality issues. The path forward included: implementing strict monitoring for temperatures exceeding 223°C in Zones 3-4, recalibrating the controllers for Zone 5 to ensure stability, conducting thorough inspections of thermocouples and heater bands, and crucially, establishing early warning alarms based on the identified critical parameters. What had been a costly and baffling mystery, draining thousands of dollars weekly, was now a precisely defined engineering problem with a clear set of solutions.

The Transformation

RIOT Industrial's intervention demonstrated that the most critical and costly production issues often lie hidden in plain sight. These problems manifest not in obvious system failures, but in the subtle variations, peak anomalies, and thermal instabilities that traditional analysis methods are ill-equipped to detect. In this case, the manufacturer discovered that sometimes, the most effective solution is an AI capable of seeing beyond the obvious, transforming a persistent mystery into a resolvable challenge and restoring operational efficiency and profitability.

Contact Us

Learn how RIOT Industrial can illuminate your production challenges.

[RIOTIndustrial.com](https://riotindustrial.com) | 888.755.7573

