



Success In Action

How A Global Conduit Manufacturer Saved \$5M in Quality Failures

BY REDUCING VARIABILITY IN THE PRODUCTION
PROCESS TO MINIMIZE DEFECTS

The Loss Of A Multi-Million Dollar Customer

A global conduit manufacturer lost a key multi-million-dollar customer due to recurring shipments of out-of-spec pipe which could cause safety-related issues in the field.

Even with significant investments in advanced technology and measurement solutions in place they realized they were experiencing over \$5 million in the cost of non-conformance each month.

While the measurement systems were collecting rich sets of data, accessing that data took manual intervention. If the data was not manually pulled within 24 hours, it was no longer accessible resulting in extended periods of manufacturing defective product.

The team realized they needed a better way to process data and proactively identify and address potential quality failures.

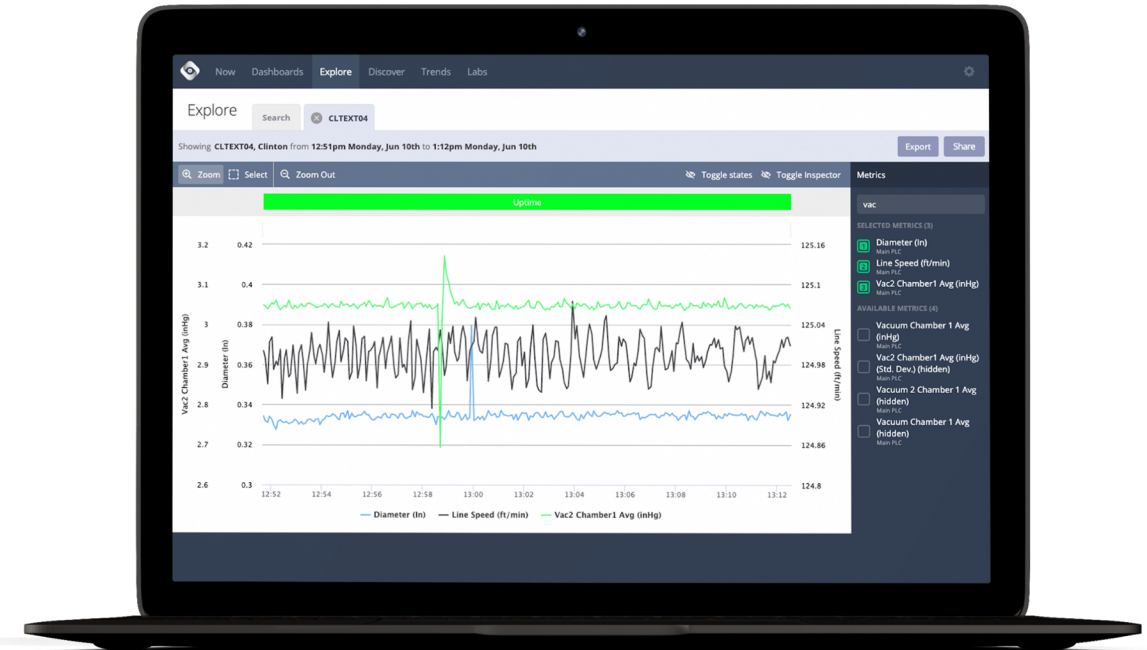


Optimizing Production Process Controls

The team engaged Oden Technologies to provide a product traceability solution that would reduce defects and perfect line speed targets without sacrificing first pass yield.

The process began by collecting and analyzing all relevant data for the ongoing measurement of pipe being produced, as well as, the associated process data leading to those results which:

- Provided greater product traceability for plant managers and quality assurance teams
- Helped identify and address suspect product to reduce the likelihood of defects being shipped to customers.
- Gave supervisors and process engineers access to all data necessary to properly conduct root cause analysis.



The Initial Impact Of Increased Visibility Into Production Process Controls

Increases Allowed The Global Conduit Manufacturer To



Improve supervisor responsiveness to issues by 30+ minutes per incident.



Allow engineers to make process improvements 10x faster.



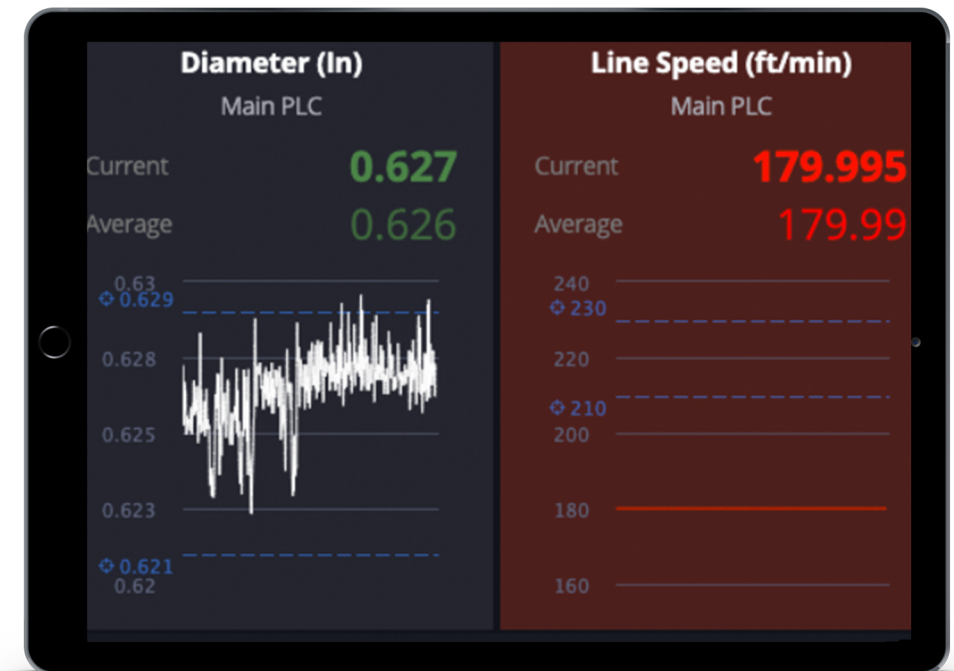
Save 5+ engineer hours per week through the automatic capture and storage of data.

Moving Toward Predictive Performance

With faster analysis of process data, engineers were able to move from simply diagnosing problems to proactively improving performance and product quality.

Oden's Golden Run™ evaluated historical measurement data to find the optimal output rate when pipe measurements had the tightest control. The best case segments were then compared to other segments using machine learning to identify which process conditions were the most important along with optimal control limits to drive the best performance.

The out-of-the-box recommendation engine prescribed optimal settings for controllable variables to replicate these runs more consistently. Real-time alerts when critical process conditions went outside of optimal parameters allowed engineers to quickly take action and prevent quality failures from happening.



Winning the Customer Back

In the end, the conduit manufacturer was able to improve product quality and recover their lost customer.

Additionally, they were able produce orders more efficiently as Golden Run recommendations identified over 200 production hours that could be saved by adjusting settings.

This allowed them to lower operating costs associated with individual orders as well as fill subsequent orders faster by reducing the opportunity cost of machine time.

Summary of Time Savings Per Line

The overall achievable savings per line

Line ID	Time Savings (hours)	Time Savings (%)
Line 1	409.18	23%
Line 2	213.20	15%

The top savings achievable by product group

Group ID	Average Performance	Total Uptime Duration (hours)	Benchmark Performance	Time Savings (hours)
Group 3	137.26	1,134	189.99	330.1
Group 1	169.35	777.6	200.01	119.0
Group 2	185.99	517.3	220.00	87.7

The Journey: Six Steps To Success

- 1** Define the expected business impact and determine what data needs to be collected.
- 2** Structure data into a consistent format including complex calculations and metric conversions.
- 3** Access insights through performance dashboards with time-series analysis, data exploration and more.
- 4** Train and deploy machine learning models to detect patterns that have previously led to problems.
- 5** Monitor live production data to predict problems and alert factory personnel to take corrective action.
- 6** Prescribe recommendations and optimized settings to replicate most efficient runs more consistently.



TURN DATA INTO INTELLIGENT ACTIONS FASTER WITH **GOLDEN RUN™**



Golden Run™ is a proprietary recommendation engine specifically designed to address the needs of manufacturers for efficiency and to identify the most profitable way to make a product. It enables manufacturers to solve problems faster than ever before and unlock cost-saving efficiencies from data that could have remained hidden.

Using machine learning algorithms, Golden Run identifies where changes and improvements can be made and generates new settings so manufacturers can continually realize cost-saving improvements.

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