

CASE STUDY · INDUSTRIAL MANUFACTURING

Solvantage Manufacturing

Digital Twin Program Cuts Unplanned Downtime 22 Percent

SUMMARY

A digital twin and predictive maintenance program for Solvantage's largest process line reduced unplanned downtime by 22 percent and paid for itself within a single planned outage cycle.

-22% UNPLANNED DOWNTIME	1 outage cycle PAYBACK PERIOD	Full critical line ASSETS COVERED	Materially Improved ALERT TRUST
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The Problem

Solvantage Manufacturing's largest process line was experiencing recurring unplanned downtime from rotating equipment failures, with maintenance operating primarily on a fixed preventive schedule and reactive response to failures rather than condition-based decision-making.

Prior attempts to introduce condition monitoring had produced sensor data that plant engineers did not trust or systematically act on, leaving significant unrealized reliability improvement on the table.

Our Solution

HydroLabs designed and deployed a digital twin for the process line's critical rotating equipment, starting narrowly with the three highest-downtime-cost assets rather than attempting a full-line rollout immediately.

The digital twin combined first-principles process models with a machine learning-based anomaly detection layer trained on the assets' vibration and process sensor history, integrated directly into the plant's existing maintenance planning software rather than a standalone dashboard.

Our team worked directly with plant maintenance planners to define clear severity thresholds linking model output to specific maintenance actions, addressing the trust and workflow integration gaps that had undermined the prior condition monitoring attempt.

Timeline

Asset Prioritization & Data Review	4 weeks — failure history review, asset scoring
Digital Twin Development	12 weeks — model build, validation against live data
Maintenance Workflow Integration	6 weeks — decision framework, planner training
Line-Wide Expansion	5 months — extension to remaining critical assets

Results

- Unplanned downtime on the process line fell 22 percent year over year following full deployment, driven primarily by earlier bearing and gearbox fault detection that shifted repairs to planned maintenance windows.
- The program's estimated avoided downtime cost exceeded its total implementation cost within the first planned outage cycle following full deployment.
- Plant maintenance planners reported meaningfully higher trust in and usage of condition monitoring alerts following the workflow integration redesign, addressing the adoption gap from the prior monitoring attempt.