



IMPLEMENTATION  
**ENGINEERS®**  
BEYOND CONSULTING

## IX® Case Study

# Solving Corrugation at the Source: \$2M Annualized Impact in Specialty Paper Manufacturing



**\$2.0M**annualized  
savings**75%**improvement in  
corrugation rate**47%**waste  
improvement

A North American specialty paper manufacturer was grappling with persistent corrugation defects on its PM1 machine. The issue not only led to elevated scrap and rework but also jeopardized customer relationships and margin performance. Despite previous kaizen efforts, the problem persisted. Implementation Engineers was brought in to lead a structured DMAIC initiative to deliver lasting results.

## Data-Driven Execution

Implementation Engineers applied its Implementation Execution framework using DMAIC as the backbone:

- **Defined the problem and established baseline metrics** (5.3% corrugation rate, 15% waste)
- **Analyzed over a year of historical machine and process data**, performing six Design of Experiments (DOEs)
- **Uncovered a hidden root cause**—microbial contamination in the thick stock—driven by low pH conditions that created biofilm and impaired drainage
- **Implemented mechanical and chemical improvements** including alignment corrections, felt condition protocols, and a trial biocide program
- **Established a comprehensive control plan**, incorporating real-time monitoring, updated FMEAs, and operator routines

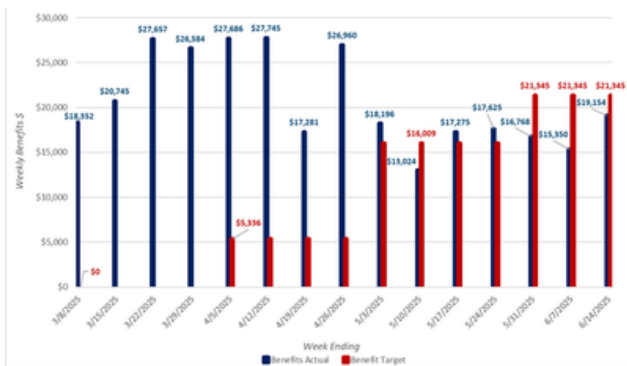
## Technical Insight: The Real Root Cause

What looked like a mechanical issue turned out to be biological. A strong inverse correlation ( $R^2 = 91.7\%$ ) was discovered between pH and microbial loading in the pulp, which compromised dewatering and led to uneven tension and moisture—manifesting as corrugation at the winder.

**Key controllable variables** included:

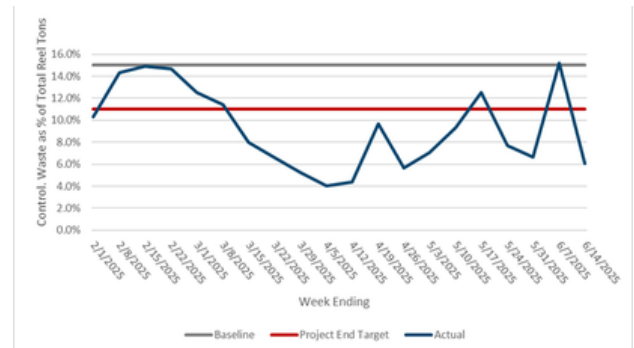
- Thick stock MicroBio levels
- pH balance at the headbox
- Press and dryer alignment
- Felt age and cleanliness

**Corrugation Benefits vs Target**



**\$310K**  
corrugation  
savings  
during project

**Waste % by Week**



**47% improvement**  
to baseline

## Summary

### \$2M Annualized Value Creation

The project generated a sustainable \$2 million annualized benefit through scrap reduction, improved sellable output, and lower operating costs.

### \$550K Captured in Just 14 Weeks

During the 15-week engagement, \$550K in real savings were realized—well ahead of expectations.

### Long-Term Risk Reduction

Sustainment systems—including FMEA, control plans, and microbial tracking—were embedded to prevent regression.

Through deep data analysis, technical problem-solving, and frontline implementation, we resolved a long-standing issue and delivered measurable, repeatable value. This is execution that sticks.

# Let's Turn Your Vision into Results

At Implementation Engineers, we don't just execute projects - we transform your vision into operational reality. Our proven 3-phase approach - **Align, Design, Execute** - delivers lasting value, from aligning your team on strategic goals to optimizing operations and driving measurable outcomes. Whether you're aiming to lead your market, boost efficiency, or maximize shareholder value, we're here to make it happen, step-by-step, side-by-side.

## Ready to Get Started?

Let's explore how we can bring your vision to life. Contact us today to schedule a conversation. Together, we'll chart the path to your success.

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