IMPLEMENTATION ENGINEERS®
BEYOND CONSULTING

CASE STUDY

Operational excellence at work in a large corporation

Changing behaviors, accountability leads to profit, bonuses

An Implementation Engineers Engagement

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Lack of visibility, measurements lead to $65 million shortfall

The largest producer of iron ore pellets in North America needed to determine how it could increase throughput and reduce cost per ton of its largest mining operation. This operation, consisting of two separate pit mines and plants, had been struggling for the past several years to meet financial and production expectations.

Its management tracked numerous performance measures, but the site did not have an integrated system to Define, Measure, Analyze, Improve, and Control (DMAIC) the fundamental forces at work in its business. The lack of visibility into its day-to-day processes had contributed to the past and current operational performance problems. These problems culminated in a $65 million shortfall against the previous year's production commitments.

Improvement opportunities at all operations revealed

At the conclusion of long term planning phase, Implementation Engineers provided an assessment of the leadership and organizational culture climate. This assessment illustrated the barriers in communication, lack of accountability and performance feedback, and the underlying issues for the poor performance.

Secondly, a Value Stream Analysis of both mine operations was developed, including a business case in excess of $250 million dollars in opportunity across the next five years (see Figure 1). A project list of opportunities by each functional area from drilling, blasting, hauling, crushing, concentrating, balling, pelletizing, stockpiling, on through shipping to the customer was included.

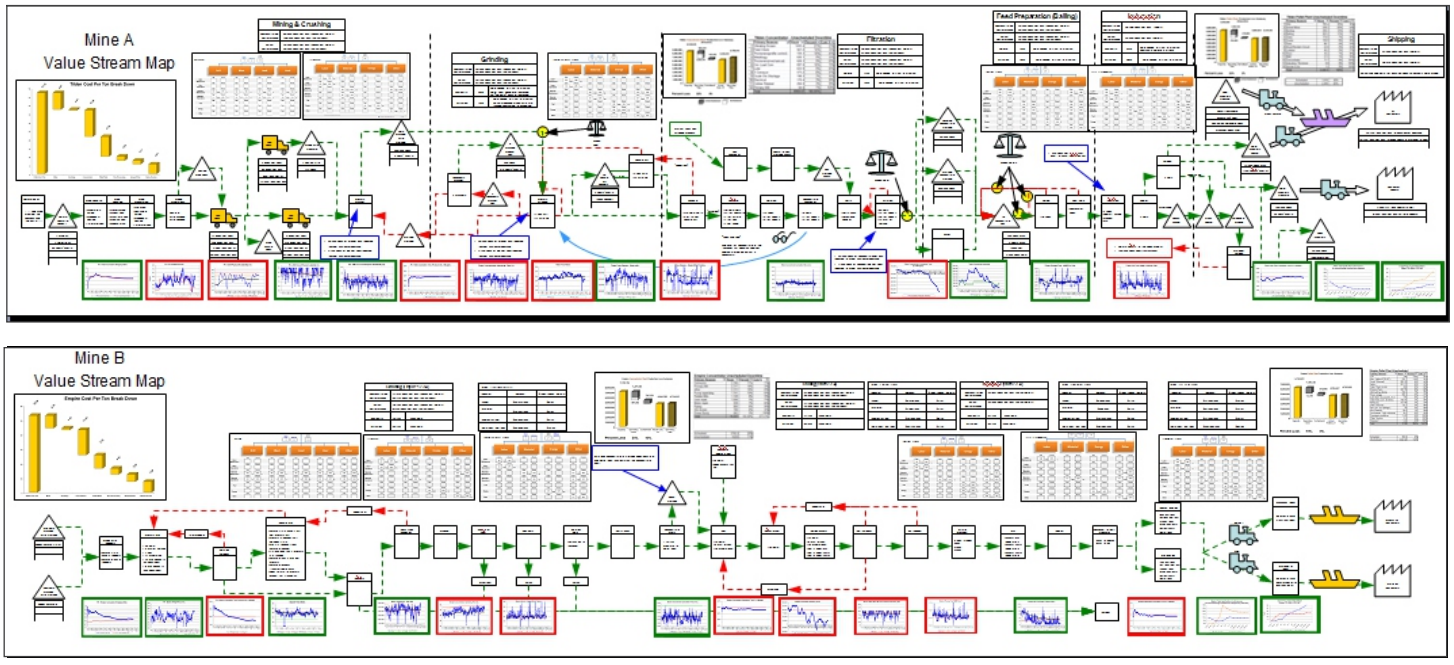


Figure 1: Value Stream Analysis: Cost, Quality, Throughput & On-time Delivery

Third, a preliminary Performance Analytix® (PA) process was utilized to illustrate the types of tools required by managers and supervisors to monitor and analyze the operation. PA is IE's data-driven tool that provides real-time, visual Key Performance Indicators about all levels of an organization, so everyone can see how improvements are impacting performance.

Implementing an Improvement Operating System to drive the execution of continuous improvement efforts and achieve the benefit opportunity was the next step. It involved developing PA, establishing a manager operating review, and creating a continuous improvement steering team and a tollgate process that would mentor and review ongoing Six Sigma projects.

In the company's annual report, the following three issues were cited as contributing to missing the operating plan and earnings estimates: 1.) stripping ratio, 2.) fuel costs, and 3.) unscheduled maintenance downtime.

Performance Analytix®

In the next phase of implementation, further refinements using Performance Analytix® were enabled. Actions included inputs from the Value Stream Analysis and the management team to develop the vital few Key Performance Indicators (KPIs). A digital cockpit was built, and gaps between performance and the operating plan were revealed. These tools provided insight to the trends and root causes of underperformance on a real-time basis — providing quantum advancement in their managerial capabilities.

At the onset of the Performance Analytix® Phase, the two operations at this location had slipped behind their operating plan immediately. The stripping ratio of the first operation continued to be three times higher than the operating plan. In Plant A, accounting procedures also hid stripping costs in Labor Usage and Plant Spending making it approximately 80% of the root cause of Cost Per Ton Variance (see Figure 2). The second operation had a four-week unscheduled downtime event in March in the pellet plant, which put production behind a month at the end of the first quarter (see Figure 3). The run rate at the end of the first quarter was worse than the previous year, so the joint team had to move rapidly to implement the new processes to bring the operations under control.

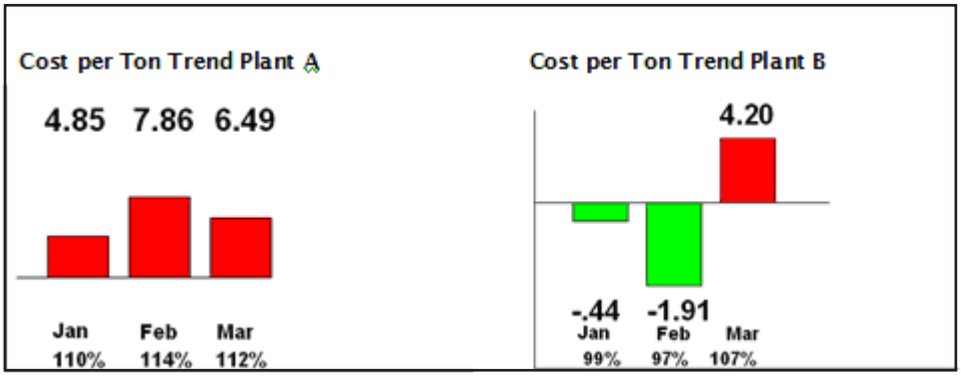


Figure 2: Cost Per Ton Variance to Plan

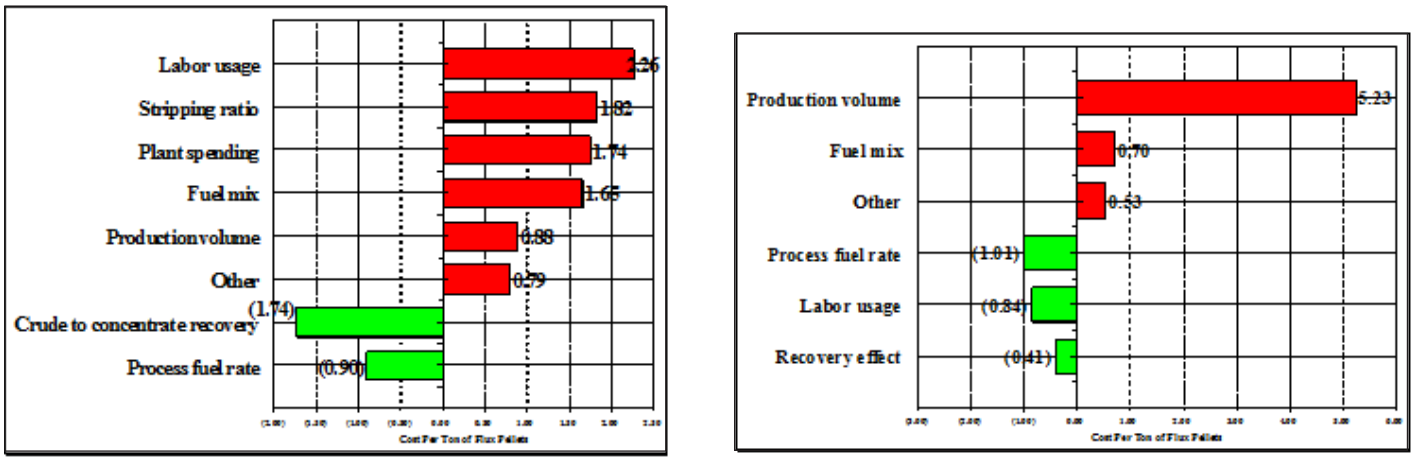


Figure 3: Cost Per Ton Variance By Contribution Factor (Plant A Left, Plant B Right)

Implementation Engineers led the effort to:

- Determine the vital few Key Performance Indicators (KPI) or X's that drive the business Y's;
- Develop a score card that summarizes the overall plant performance in seven categories (Safety, Operations, Maintenance, Cost, Product Quality, Environment, and Human Resources);
- Create a digital cockpit with time series KPI graphs by each category (see Figure 4) and;
- Build graphical analysis tools that explain variances to the operating plan and lost production (see Figure 5). In addition, three critical managerial processes were implemented as the engine to drive performance improvement.

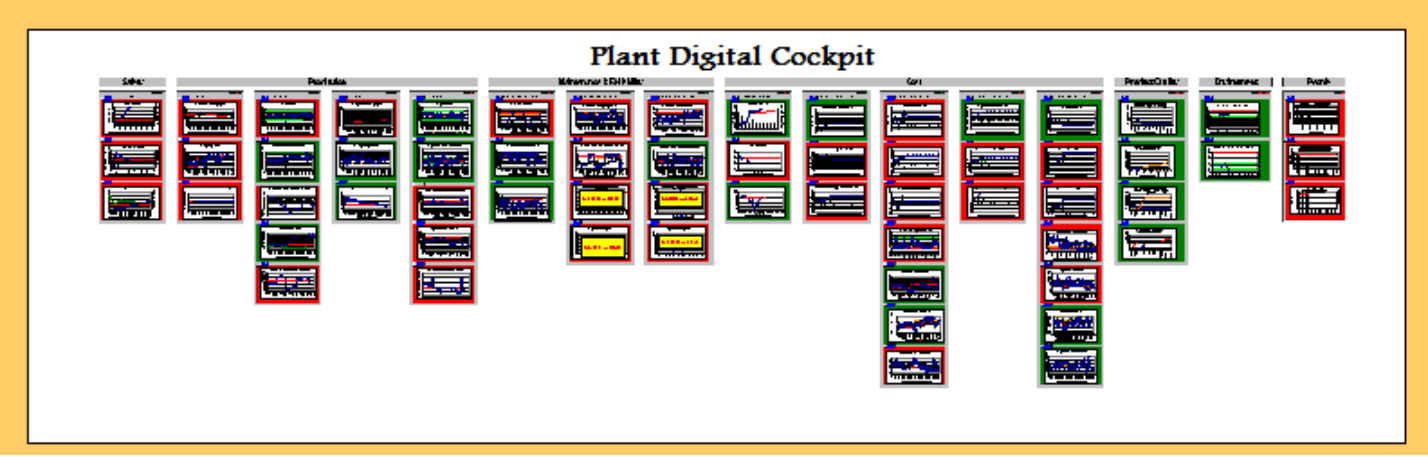


Figure 4: Digital Cockpit (Safety, Production, Cost, Product Quality, Environment, HR)

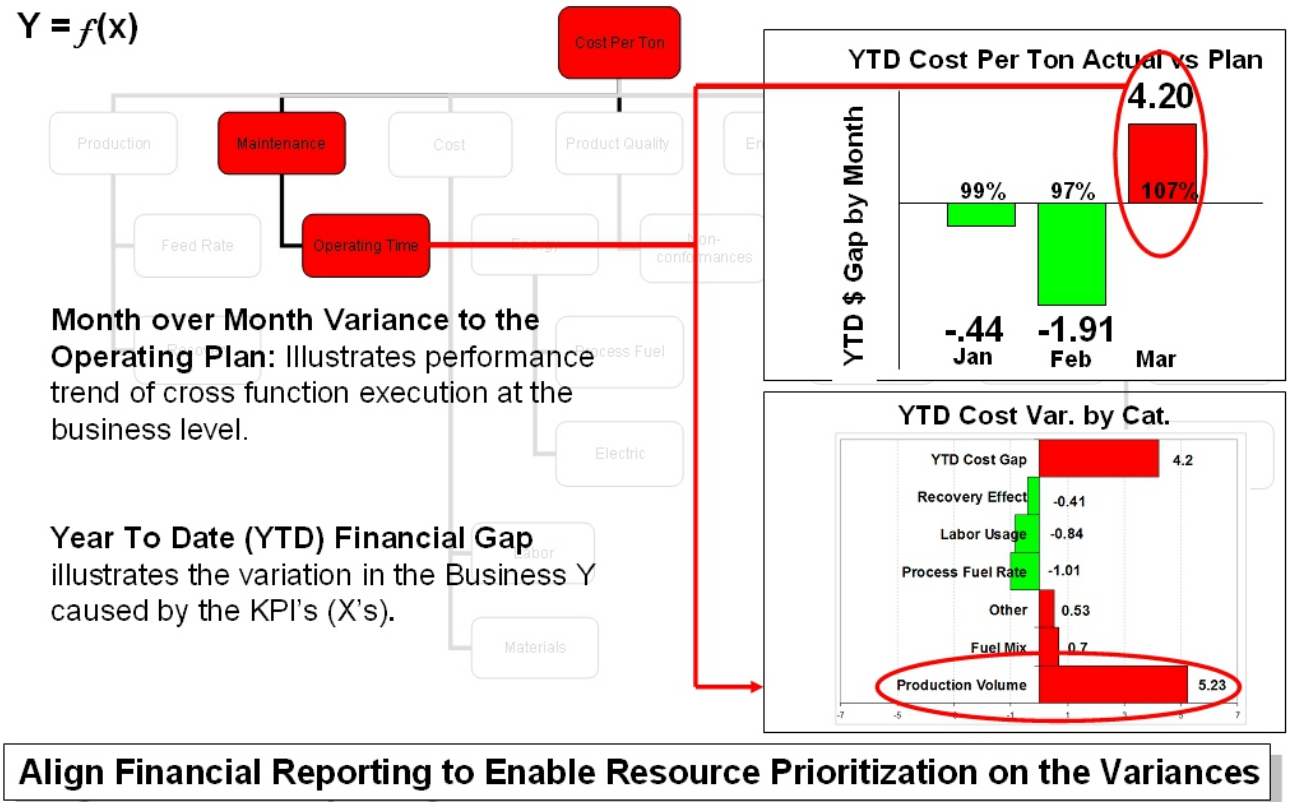


Figure 5: Example of Graphical Analysis Tools to Explain Variances to Plan

Improvement Operating System

Creating an Improvement Operating System (see Figure 6) was vital to drive, maintain, and create improvements.

- Improvement Operating Review Process

  Management teams were mentored on how to analyze KPI data, create contingency and recovery plans, and report performance in a bi-weekly operating meeting. The objective being to identify the time-bound action plans that will drive the most significant gains and identify the resources needed to achieve the goals.

- Steering Committee

  The Steering Committee, comprised of core plant leadership team, reviews business needs from the results of the Management Operating Review and project ideas brought forth by the Department Champions. It rationalizes the ideas, prioritizes them, and aligns the resources with the activities and projects that will deliver the most value. Implementation Engineers developed the roles and responsibilities, the process and structure to quantify, rationalize, and prioritize the business needs for the Steering Committee to act upon.

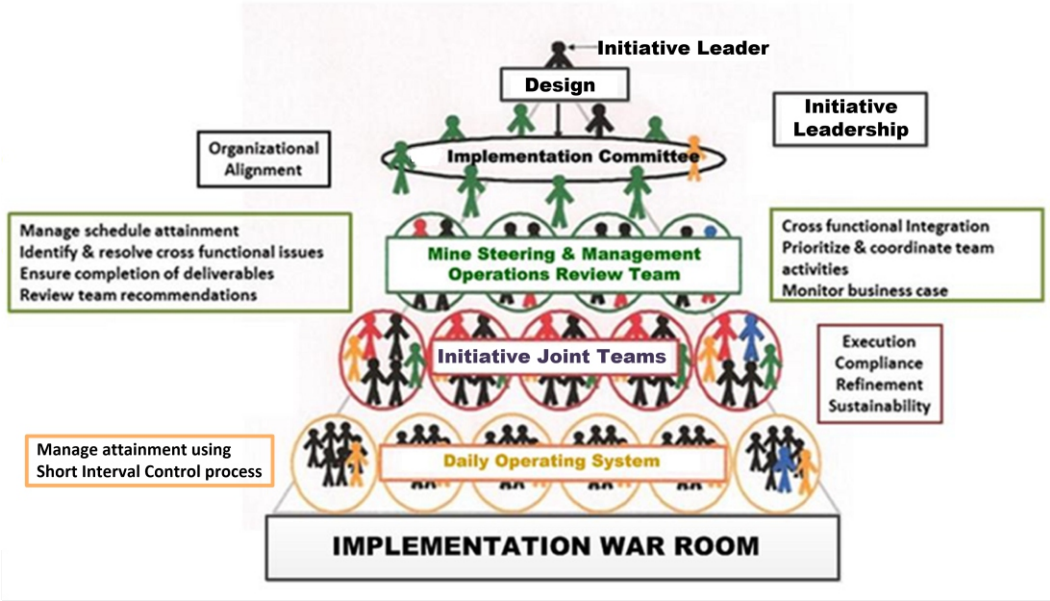


Figure 6: Improvement Operating System

- Continuous Improvement Project Tollgate Process

  Implementation Engineers facilitated the deployment of the continuous improvement team implementing a comprehensive structured road map, project financial review, and project tollgate process, whereby the project leader methodology is reviewed, scrutinized, and revised to accelerate the results and ensure that the net benefit is real.

Improvements, positive results take root within 3 months

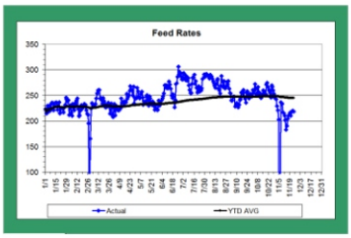
Three months into the new Improvement Operating System, the plant began to turn the corner on several of the seven KPI areas. Production recovered from a $7.5 million deficit and trended to be on track for the year, energy spending improved by $500,000 per month, and safety accidents improved by 20%. The clear objectives, cross business focus, improved communication on results variance, and actions improved esprit de corps rallied a previously disjointed team around common goals. The confidence of the managers increased with each Management Operating Review as did their eagerness to share their performance improvements in their areas.

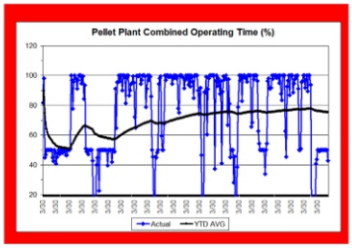
Because of the rapid improvement in performance by the end of the second quarter, the management team received performance bonuses — the first time in six years. This created a windfall of support in the new way of managing the operation. Admittedly, there was a great deal of resistance in the first three months of the process. Several managers were outwardly opposed to changing how things were run. It was through persistence, coaching, strong support from top management, and allowing the early adopters to take the lead and received positive feedback of wins that enabled the conversion of the initial skeptics — performance bonuses help as well.

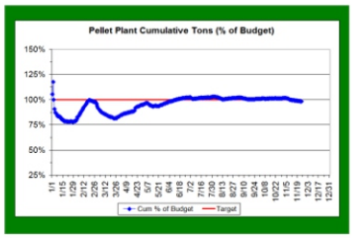
At the beginning of the third quarter, the general manager presented the new Improvement Operating System to the corporate Business Improvement leadership, and it was immediately rolled out to the other five North American mining operations to organize and standardize the company's operating system. At the end of the first calendar year, the management team sustained an annualized cost per ton improvements at Plant A and Plant B (see below).

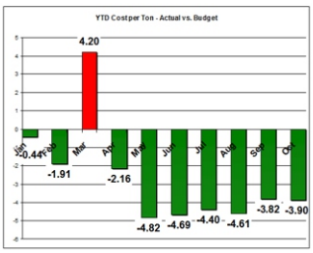
Plant A

Improvement in Feed Rate by better managing the ore blend and operating time due to a 5S program implementation in maintenance improved cost absorption. Plant A was on target and exceeded its budget by $28 million.



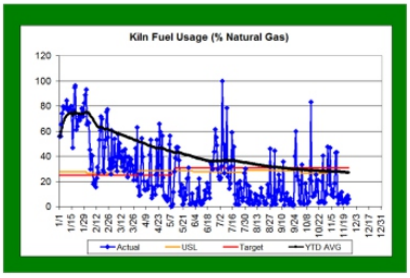


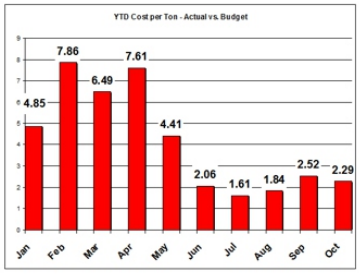




Plant B

Improvement in Stripping Ratio by revising the mine plan and Kiln Fuel by converting to western coal reduced cost variance by $22M by year-end.





In the fourth quarter, Implementation Engineers led the second annual cycle of Long-Term Implementation Planning by identifying additional savings opportunity in energy in the grinding lines, and also the next evolution of the Improvement Operating System implementing the Daily Operating System.

In the company's annual report, it was cited that the cost per ton of the operation was expected to increase by 12%, but due to cost-reduction efforts, the cost per ton in North American operations only went up 1%. In addition, because the high demand for steel and general inflation, the price of iron ore went up 10% creating a huge improvement in the company's bottom line. enCompass® continues to positively impact its financial performance — it has changed the culture and become the way this mining operation does business. enCompass® is the framework that drives all of IE's projects to help organizations develop and maintain behaviors and practices to generate sustainable results.

NEXT STEPS ›

- Schedule a meeting with our team to learn about our enCompass® methodology and how IE can improve your operations.
- Interested in learning more about the topic covered in this case study? Call us at 1-312-474-6184 and reference the paper you're interested in. We would love to discuss your initiatives.
- Visit www.implementation.com to find out more about our services.

IMPLEMENTATION ENGINEERS®
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At our core, Implementation Engineers is a data-driven, global firm with a razor-sharp focus on enhancing mining and manufacturing operations.

We have volumes of success stories, and they can all be attributed to our revolutionary enCompass® methodology. This industry-first approach gives us not only the knowledge to inform you of what needs to be done, but the power to actually implement those solutions for lasting impact.

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