



CASE STUDY

Multi-site operational excellence implementation

OpEx approach enables faster response to business needs

An Implementation Engineers Engagement



Existing CI activities fall short, lack benefit

The client had engaged in numerous Continuous Improvement (CI) activities to increase production in Canada and Latin America. The approach included implementing a Management Operating System (MOS) in operations as well as basic problem solving techniques. These processes did result in small improvements, however challenges still existed with the old way of doing things. Roles and responsibilities were unclear, and the processes, deliverables, expectations, and Key Performance Indicators (KPIs) were not well-defined to support of the management system. Additionally, asset capacities were not well understood or tracked, which did not provide the leadership team with the necessary information needed to actively manage the organization. Feedback and follow-up also needed improvement to optimize compliance, minimize daily / shift production performance variability, and reduce cost.

Increasing production, capacity, necessary HPM behaviors

Linkage into the business strategy was critical in aligning the Operational Excellence program objectives. Baseline operational performance, understanding current initiatives, and cascading KPIs were all matrixed to highlight the existing gaps in the current improvement efforts. In addition to needing significant cost savings to maintain profitability in a soft market, some immediate objectives of the program included:

- Increasing throughput per day by 13%
- Implementing a High Performance Management System (HPM) including real-time data access and a visual management scorecard to provide feedback necessary in making timely decisions
- Support systems improvements in Supply Chain and Asset Management

New way of thinking permeates throughout operations

The path toward achieving Operational Excellence included holistic systems thinking that balanced improvement activities in both organizational and technical operational development. Existing systems were fortified to accept the new way of thinking, and new proactive behaviors were driven by the comprehensive approach of the enCompass® model.

Operational Engineering:

Operational Value Stream Analysis: A data-driven value stream analysis was conducted to highlight system waste and identify granular operational improvements across the business value chain. The financial benefits were established for the projects along with the customer resources requirements to implement and sustain the improvements.

Key findings included:

- Excess capacity and poor utilization of human and asset resources
- Poorly defined, non-optimal processes
- Deficient conditions in housekeeping and safety compliance
- Silo mentality between operations, engineering and the support functions
- Lack of data to make real-time decisions

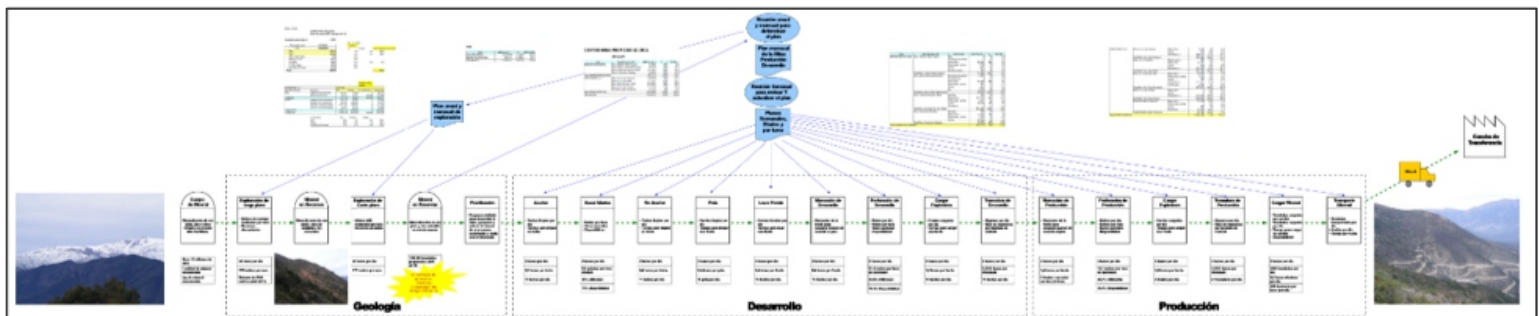


Figure 1: Value Stream Assessment

Support System Analysis: This process evaluated the site support functions and processes, including asset management, supply chain, and work management. Various assessment and diagnostic tools were used to quantify the maturity of these support systems to identify gaps in achieving optimal performance.

- Supply Chain System. Opportunities existed with:
 - Supply Chain Management. Metrics, department alignment, feedback, training, and continuous improvement.
 - Inventory/Warehouse management. Inventory categorization, valuation, turnover, obsolescence, damage, stock outs, accuracy, location accuracy, etc.
 - Purchasing. Lead times, supplier performance, returns, transportation/freight management, etc.
 - Customer Satisfaction. Methods of feedback, metrics, follow-up, etc.
 - Stock Level Management. Critical spares, no min/max levels, over 200+ jobs delayed due to lack of planning and available materials

- Asset Strategy. The system was evaluated using a structured process to evaluate current state maturity, including (See Figure 2):
 - Asset Hierarchy development and equipment numbering system
 - Critical equipment identification process
 - Ratio of corrective actions to PM inspections
 - PM Conformance (PMs due on the horizon to actually scheduled)
 - PM Completion (PM tasks completed on weekly schedule)
 - PM Compliance based on the 10% Rule (PMs completed within 10% of time-based scheduled, e.g. 30-Day time-based PM will have a 3-day window for completion)
 - Percent of assets with a PM strategy implemented
 - Predictive Maintenance (PdM) technologies implemented
 - Current metrics and management system to control and improve overall health of the PM program

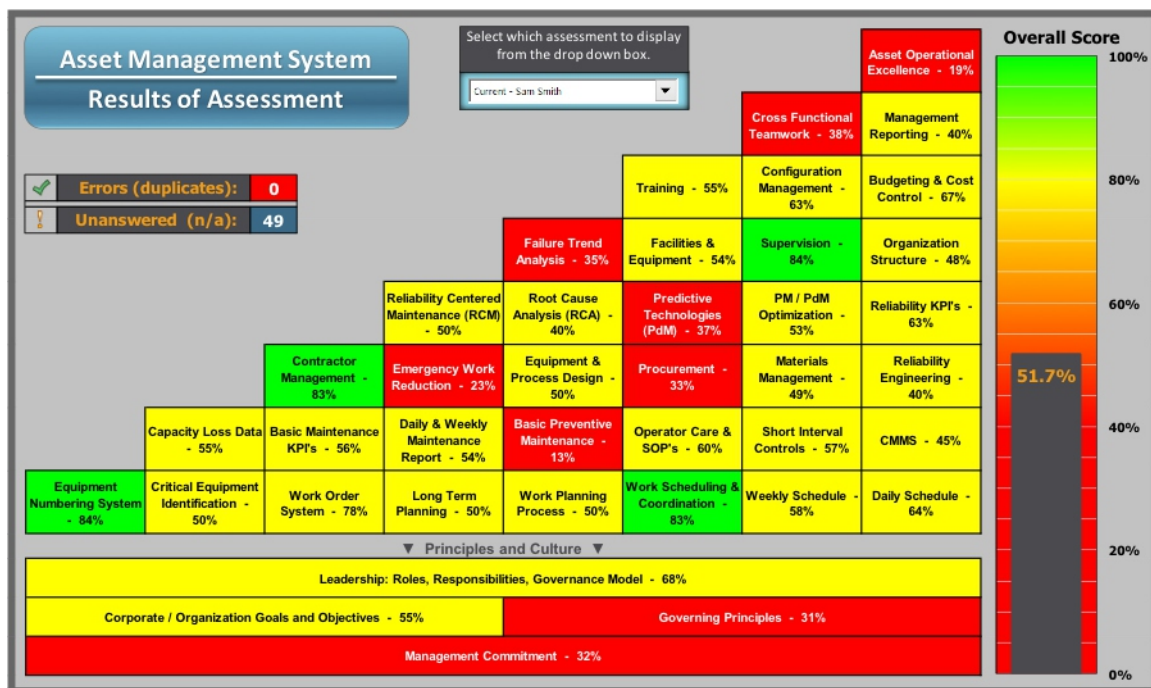


Figure 2: Asset Strategy Assessment

- Core Maintenance and PM Work Processes

- Reviewed current state maintenance processes and procedures necessary to execute foundational work management processes with a major focus on work planning, scheduling, and execution (without robust work management processes the PM strategies were not be successful)
- PM process reviewed for content, effectiveness and timing of execution. A value stream map and process maps were created to understand the value added and non-value added activities currently performed. Additionally, the PM creation and reduction logic was also assessed.

Organizational Engineering

Organizational Diagnostics were performed to assess the gaps that exist in the achievement of a High Performing Organization, including structure, attitude, behavior, and perceptions. High performance related to a variety of factors (e.g., motivation, teamwork, engagement, personal development, leadership style, and communication). Both high performing individuals and teams were needed, and a series of workshops were performed to enhance these organizational capabilities. An outline of the diagnostics is listed in Figure 3, with the gap analyses illustrated in Figures 4 and 5.



Figure 3: Overview of Organizational Diagnostics Framework

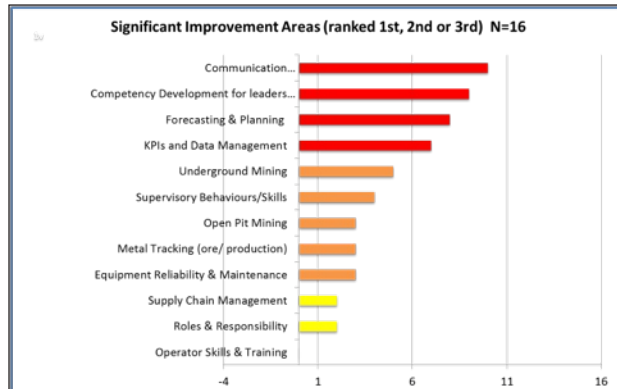


Figure 4: Diagnostics for Canadian Operations

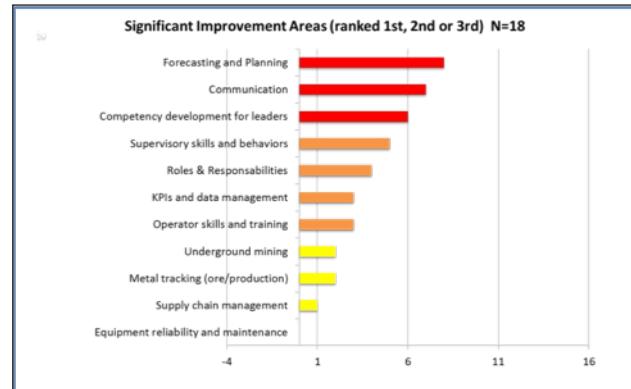


Figure 5: Diagnostics for Latin American Operations

In addition to these diagnostics, the overall organizational structure and decision making capability was mapped out, analyzed and assessed for effectiveness. Figures 6 and 7 illustrate the methodology and results, respectively.

STRATIFIED SYSTEMS THEORY (SST)		
THE INDIVIDUAL (Bands of maturity associated with the level)	THE TASK (Levels of complexity associated with the level)	THE ORGANISATION (Hierarchical layers in the MAH (strata))
Mode VII	Construct complex systems	Stratum VII CEO COO
Mode VI	Oversee complex systems	Stratum VI Enterprise Vice President
Mode V	Judge downstream consequences	Stratum V Business Unit President
Mode IV	Multiple paths, parallel processes	Stratum IV General Manager
Mode III	Create alternative pathways	Stratum III Unit Manager
Mode II	Diagnostic accumulation	Stratum II First Line Manager
Mode I	Practical judgment to overcome obstacles	Stratum I Shop / Office Floor

Figure 6: Stratum Methodology



Figure 7: Compression in Reporting Structure

Key Focus Areas and Timeline

Based on the gaps highlighted in the value stream, support system structure, and organizational capabilities, we developed a comprehensive two-year Operational Excellence deployment plan to elevate performance across all areas. Targeted Savings is \$66M combined for all sites.

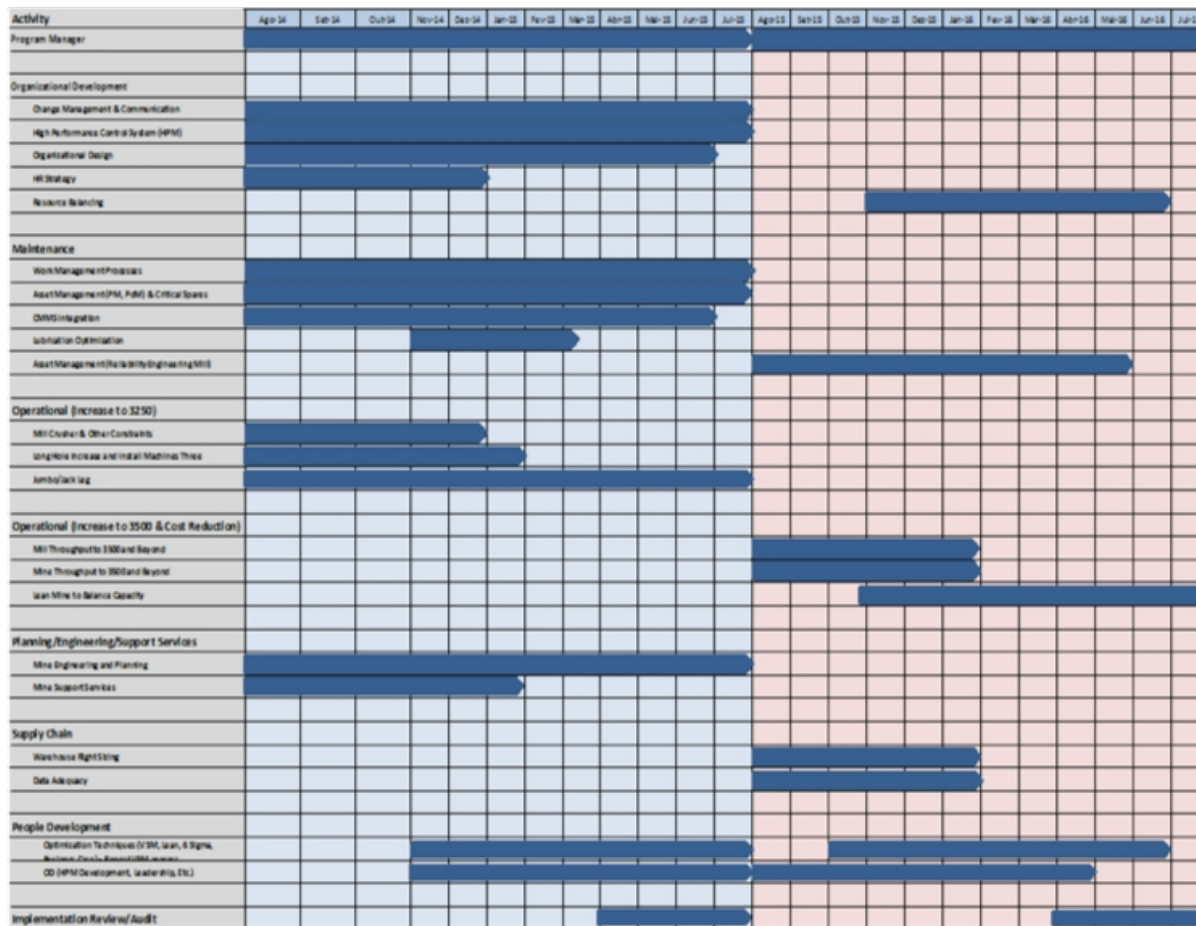


Figure 8: Detailed Work-Stream Plan

Operational / Organizational Excellence Results

All sites met or exceeded all Operational Excellence objectives within first year of deployment. Below is a sampling of metrics from a single site.

The combined annualized savings for all sites was over \$67M per year. In addition, through the enhanced capability of human capital and infrastructure, the Operational Excellence program continues to implement strategically aligned projects that deliver bottom-line results year over year.

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Implementation Engineers 2015 Results (Dec'14-Nov'15)

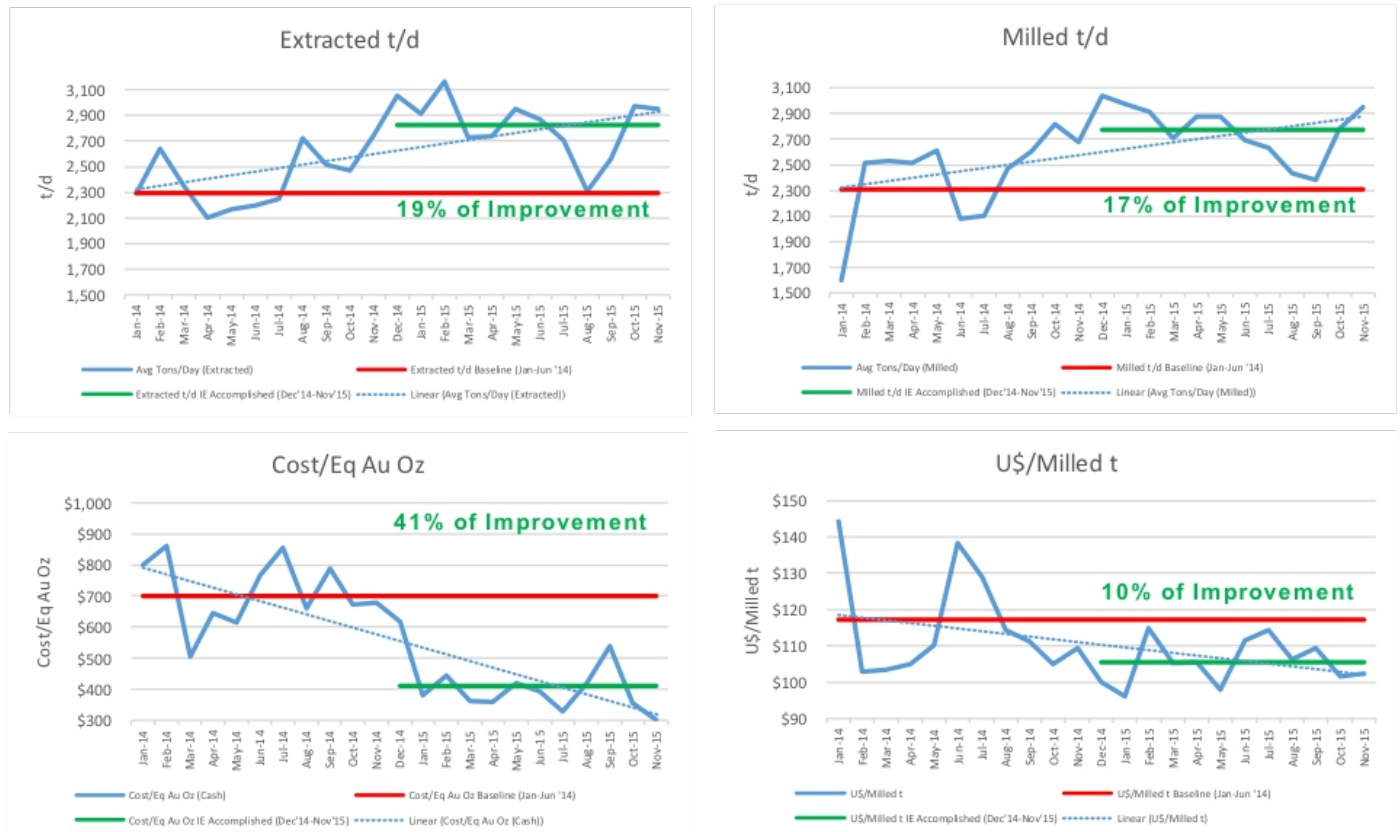


Figure 9: Sampling of Improve Metrics from Single Site

High Performance Management System: The existing management operating system (HPM) structure was further strengthened via key workshops, and by establishing a detailed accountability and communication protocols. This framework ensured the forward momentum necessary to implement true Operational Excellence. The key to the HPM effectiveness was integrating strategic direction, operational performance, and the actions and activities that were the true drivers of performance. This integration was achieved and maintained through deliberate, regular, and formal communication, and information sharing events: active rather than passive communication.

The HPM ensured that these strategically aligned performance indicators were reviewed regularly and at the appropriate operational levels. The system ensured that poor performance was answered by root-cause investigations and not excuses, and that the actions and activities generated from those root-cause analyses were managed regularly and actively to ensure that corrective actions were implemented on a timely basis.

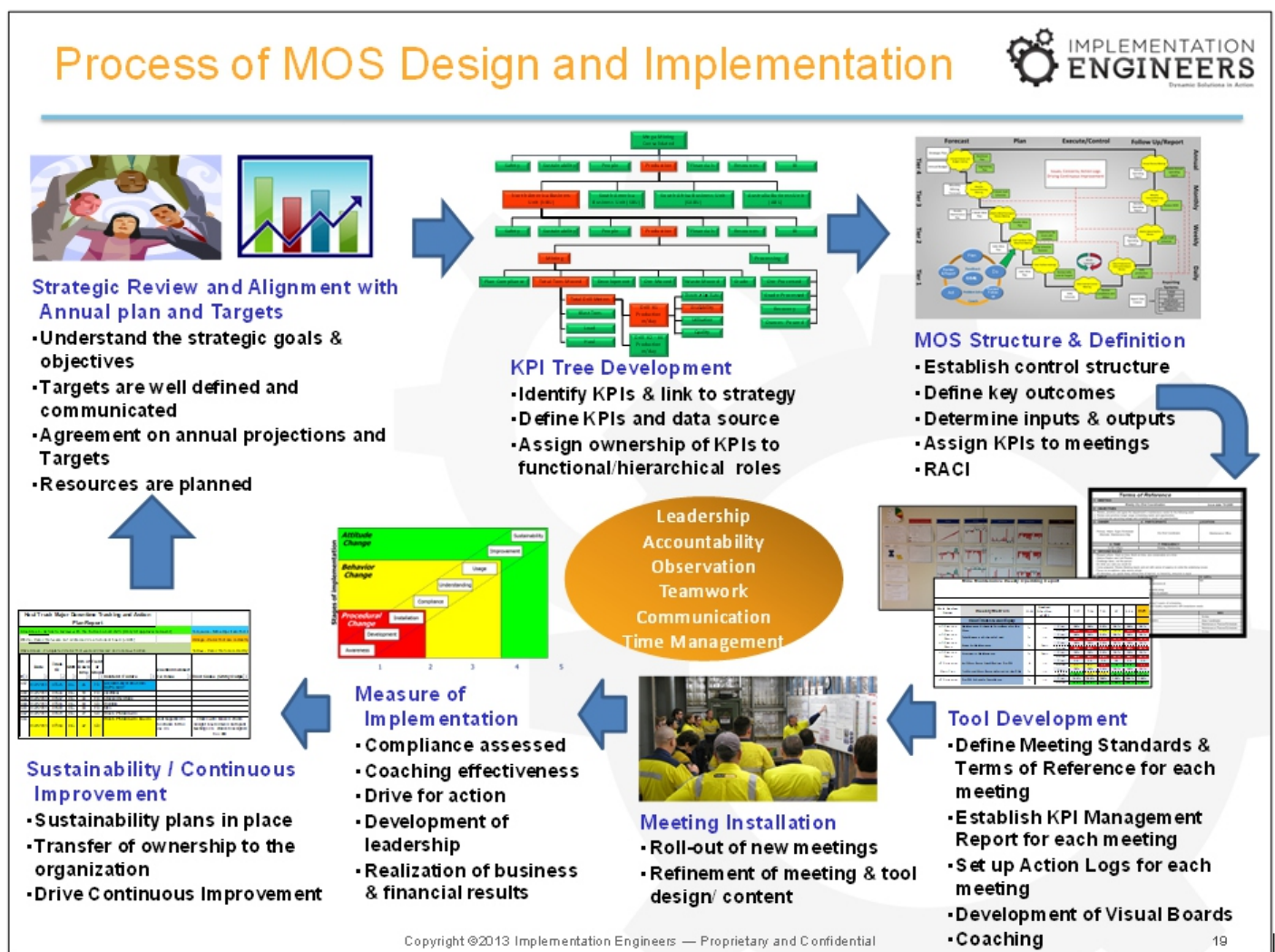


Figure 10: HPM Structure

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.



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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