



## Project Summary

### Organization:

ArcelorMittal Mines Canada

### Solution:

The Bentley software solution for mining and metals offers both short term and long term benefits to help increase the efficiency of capital projects associated with the design, procurement, and construction of mines and processing plants.

### Location:

Québec, Canada

### Project Objective:

- Maximize asset utilization, accomplish more with same manpower and same or less equipment

### Products used:

- AssetWise Ivara Performance Management software
- Aladon RCM2

## Fast Facts

- Leading producer of iron ore products in North America
- Represents half of Canadian production sold on open market
- Mont Wright open pit mine – annual capability of 18 million metric tons of iron ore concentrates
- Railway operation – over 260 miles (418 kilometers) of track in Québec; over 20 locomotives, over 950 ore cars, and over 300 utility cars
- Port-Cartier pellet plant – annual capability of 9 million metric tons of iron ore pellets

## ROI

- Large wheel loaders operating costs dropped by 43.4 percent
- 190-ton off-highway trucks life span extended by more than 60 percent with more performance
- Wheel dozers plant gets more performance with half the fleet

# ArcelorMittal Mines Canada Saves CAD 7 Million Annually in the Maintenance Shop

ArcelorMittal Mines Canada is one of the leading producers of iron ore products in North America. The company is comprised of ArcelorMittal Mining Canada G.P. (mine site and pellet plant) and ArcelorMittal Infrastructure Canada G.P. (rail road and port site). The open pit mine and crusher/concentrator facility is capable of producing 18 million metric tons of iron ore concentrates annually at Mont Wright in northern Québec. The company also operates a pellet plant with an annual production capacity of some 9 million metric tons of iron ore pellets at Port-Cartier, Québec.

## The Situation

The proven and probable reserves of ArcelorMittal Mines Canada are estimated in excess of 50 years' supply, although the mine's ore concentration level has gradually decreased over the years. Today, concentration is at 28 percent, compared to many other mines with 50 or 65 percent iron ore concentration.

## The Challenge

To continue to be successful, ArcelorMittal Mines must now mine and process more rock for each ton of iron ore produced. To meet this challenge, the company has reduced costs over several years, becoming a very lean organization. However, it was apparent that additional measures were required. Already pared down, the only solution was to find a way to accomplish more with the same manpower and the same or less equipment.



Mont Wright mine ore processing plant.

## The Solution

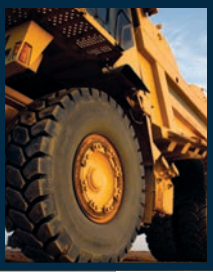
One of ArcelorMittal Mines' most important strategies for doing more with less, and driving increased profit without increasing costs was to partner with Bentley to focus on optimizing the reliability of its mining assets. Bentley's asset performance management software has enabled the company to move to a proactive, condition-based approach to maintenance, optimizing asset reliability and driving business results. With this approach, profitability is now strongly connected to the reliability of the company's assets.

With a reliability strategy, ArcelorMittal Mines focused on improving the business process of maintenance – ensuring that the things people do each day include the right work on the right equipment. The company developed competency in reliability practices, Aladon Maintenance Task Analysis (MTA2) and Aladon Reliability-centered Maintenance (RCM2). ArcelorMittal Mines installed AssetWise Ivara Performance Management software as the tool to support the best practices and to ensure efficiency and effectiveness of the process.

As part of this initiative, ArcelorMittal Mines established a technology transfer group (TTG), whose responsibility was to provide transitional direction to its business units. The TTG members learned about the latest reliability practices from Bentley practitioners.

With input from Bentley, the TTG established the company's reliability business process and applied the best-in-class practices, moving ArcelorMittal Mines toward its goal of achieving a world-class maintenance process.

ArcelorMittal Mines quickly realized that the opportunity for reliability improvement to impact the bottom line in their maintenance shop was significant. With the old way of thinking, equipment (trucks, tractors, loaders, and other mobile assets) was taken out of service for repair when it broke down or at a specified number of running hours, necessitating either the availability of replacement equipment (hence a larger



*Bentley’s asset performance management software has enabled the company to move to a proactive, condition-based approach to maintenance, optimizing asset reliability and driving business results.*

fleet) or a halt in production. Repairs were performed according to the availability of parts and personnel, further extending downtime. This old way of thinking was no longer viable and a new approach was adopted that focused on optimizing asset reliability, requiring closer attention be paid to the health of the equipment, not just its hours of service. ArcelorMittal Mines significantly improved the performance of its maintenance shop so that it supported the company’s productivity and profitability goals.

The TTG placed particular emphasis on establishing key performance indicators that would allow improvements to be measured and tracked, and which would also identify areas for further improvement.

**The Result**

By the first year of implementing the proactive asset care process, mine production levels were up 28 percent – without increasing resources. Mobile equipment maintenance costs (parts, labor, fuel) were down 8.3 percent per cubic meter of concentrate – even without accounting for inflation or increased fuel prices.

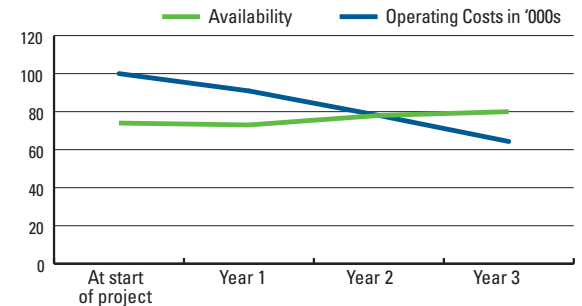
The maintenance shop has been able to realize a CAD 7 million annual contribution to ArcelorMittal Mines’ bottom line mainly by adopting a reliability-focused approach to maintenance across its mobile mining equipment.



*ArcelorMittal Mines railroad spans over 250 miles in Québec, Canada.*

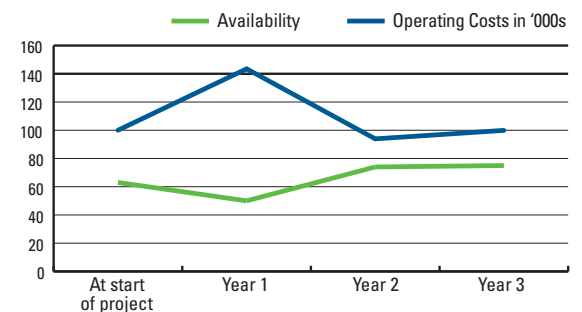
Significant improvements have been realized for every type of mobile equipment since implementation began.

*190-ton Off-highway Trucks:*



*Figure 1: 190-ton off-highway trucks: Life span is extended by greater than 60 percent with more performance.*

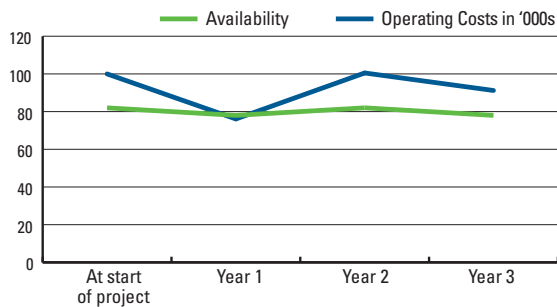
When purchased, this fleet of 25 vehicles was estimated to have a useful operating life of 50,000 hours per truck. Since applying reliability-based asset management principles, many trucks have surpassed 80,000 hours and are still more economical to repair than replace. Availability is up 6 percent and operating costs are down by 35 percent.



*Figure 2: Wheel Dozers: Plant gets more performance with half the fleet*

Through higher vehicle availability, the mine has reduced its fleet of dozers from eight to four – and significantly reduced the cost of operating each of the remaining dozers.

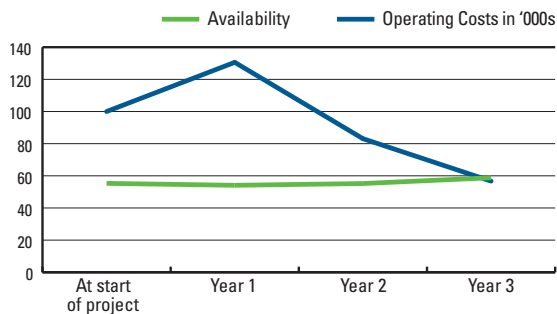
**Track-type Tractors:**



**Figure 3: Track-type Tractors: Less tractors, more performance**

The tractor fleet has been reduced from 12 to six – yet overall availability has risen by 20 percent.

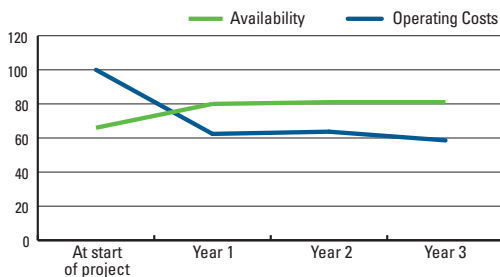
**Large Wheel Loaders:**



**Figure 4: Large Wheel Loaders: Costs dropped by 43.4 percent**

Equipment availability on the large wheel loaders has risen by 3.5 percent, and operating costs have dropped by 43.4 percent.

**Motor Graders:**



**Figure 5: Motor Graders: Reduced fleet with increased availability and lower costs**

ArcelorMittal Mines has dropped the number of levelers from seven to five while increasing availability by 25 percent and reducing operating cost by 41.4 percent. Asset reliability is also making a significant contribution to the employees' quality of life. Not only does the transition to proactive maintenance create measurably increased worker satisfaction, major safety incidences are down by 74.7 percent since year one of the initiative resulting in an additional CAD \$1.1 million in savings.

Finally, improved asset reliability has resulted in higher process stability raising the company's confidence in meeting production objectives and in managing the day-to-day operations.



**Port Cartier operates year round and handles ships up to 188,000 tons.**



**Mont Wright open pit mine and crusher/concentrator plant produces 13 million metric tons of iron ore concentrates annually.**



**Railroad links the mine and port, runs from Port-Cartier to Mont Wright in Québec, Canada.**

*The reliability initiative is credited with playing a major role in sustaining the profitability and viability of the mine.*

**Find out about Bentley at: [www.bentley.com](http://www.bentley.com)**

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**Conclusion**

While ArcelorMittal Mines Canada continues to implement Bentley's asset performance management software across its operations, the maintenance shop has already identified additional areas in which it can use Bentley's solution to achieve even greater improvements.

Having established a strategic approach to maintenance, the maintenance group will next undertake a comprehensive reliability strategy development program to examine the effectiveness of their current maintenance practices on an asset-by-asset and task-by-task basis.

The process also drives to develop a closer relationship between operations and maintenance. This improvement will create an environment in which operators work much

more closely with maintenance workers, in order to create a structured maintenance program that better meets the requirements of both groups. Comprehensively mapping roles and responsibilities at the plant level will ensure that the activities of both operations and maintenance departments are continuously linked to the specific processes needed to achieve world-class maintenance standards.

The benefits of focusing on asset reliability have been significant in terms of the company's goal of doing more with less. The reliability focus is already contributing CAD 7 million per year to the bottom line and as the initiative expands additional financial benefits are projected. The reliability initiative is credited with playing a major role in sustaining the profitability and viability of the mine.