CASE STUDY

Vale Copper Cliff Mine 114 Ore Body
SUDBURY, ONTARIO, CANADA

Increasing advance rates with innovative thinking

Underground advance rates in Canada have declined and now average 150 feet per week. Much of this decline is due to larger drifts, which require increased ground support.

At Vale’s Creighton Mine, they decided to try something new. And implemented a test in a marginal near-surface deposit adjacent to their Copper Cliff North mine. The mine itself was only partially developed, having been closed as a result of the financial crisis and plunging commodity prices. Vale wanted to see if they could return it to profitable excavation using new, rapid development applications.

Vale’s goal was to develop the drift and get to the orebody twice as fast as normal methods. They exceeded that goal with Rail-Veyor!

“Lead time to production for any project is extremely critical for the return on investment for the project. So if we can develop twice as fast as we currently do, it has a huge impact in terms of the return on investment.”

Alex Henderson
Vale GM, Underground Mining Technology

“Rail-Veyor is one piece of technology that we are using along with others to achieve extremely high rates, some cases, four times what we would call a normal advance rate on a phase. So it’s an intricate part of the design for rapid development.”

Mike Vanderhoof
Vale, Production Superintendent & Project Manager High Speed Development
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Rail-Veyor® creates new underground mining concepts.

The Rail-Veyor system at 114 Orebody consists of 53 eight-foot, 30-inch width cars, each of which holds a ton of material. A series of crosscuts at intervals along two parallel ramps reaching 700 meters serve as loading areas. A load-haul-dump machine deposits muck into the crosscuts and another piece of equipment transfers into the Rail-Veyor.

Rail-Veyor cars move at .3m/second during the loading operation. They travel up and down the 15% gradient at up to 3m/second once loading or unloading is complete. In total, it takes eight minutes to load the 53-car train and the total cycle time for loading, dumping and returning is under 20 minutes.

The Rail-Veyor control room is located on surface between the portal and the dumping loop. The operator remotely starts and stops the train, adjusts the speed and coordinates with the operator in the crosscut where the loading takes place.

Vale was targeting an advance rate of 122 meters per week — roughly twice what is typical. Vale has been able to achieve 143 meters of advance.

“The thing that impressed me most with the Rail-Veyor was how quickly it was constructed. I think the real benefit is your ability to get into production and development much quicker than with some other historical systems.”

Kate McLaughlin
P.Eng., M.Sc., Vale, Manager Technical Systems
Development Canada

Rail-Veyor
MOVING MATERIAL HAULING IN A WHOLE NEW DIRECTION

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