

Vale's Base Metals Video Series

Video 6: Underground Mining

Video	Audio/Narration
VOG Announcer intro over graphic title:	Vale's Base Metals Business Series — Focusing on Underground Mining
See geologist at work... Field exploration and then contrast to in-depth computer/sat exploration	Mining begins when someone... a prospector with a geologist's hammer or an analyst from a major mining company... finds a mineable mineral deposit.
See historic mining footage, dissolve through to modern methods, Vale branded activity	Turning that discovery into a productive mine demands planning, as every ore is different and must be treated accordingly.
See schematic of the two types of mine	Vale's base metals business operates two kinds of mines: underground mines and surface mines, also called open-pit mines. The kind of mine is determined by the type of mineralization. Each ore zone is different and each project requires a customized solution.
See different ore types	There are two types of deposits: sulphide and laterite ores. Our Sulphide ores are found in Canada, Brazil, and Zambia.
See locator map	Our lateritic deposits are found in Brazil, Indonesia and New Caledonia. We also operate a copper oxide mine in Chile.
See Sudbury and Thompson, map locate and aerial views	Most of our sulphide ore bodies are buried far underground. In this video we'll explore these deep, below-surface mines.
Nickel-sulphide ore: Totten "new mine" development Various stages of ore extraction Emphasize high-tech solutions	Underground mines demand complex mining infrastructure to solve a simple problem: How can we free the valuable ore from its surrounding rock and get that ore up to the surface for processing?

Video 6: Underground Mining (cont'd)

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<p>See headframe, main shafts</p> <p>See people going into mine, positive images, emphasize safety</p> <p>See access and high-quality internal railroad and conveyor system</p>	<p>The mine drives down deep into the earth from the head-frame where hoists and mine access machinery are housed.</p> <p>Our mine must provide safe and reliable access for people, materials and equipment.</p>
<p>See mine plan schematics</p> <p>See internal ramps</p>	<p>To get to the ore body, we carve out a combination of ramps and shafts, excavating low-value rock to get to the ore, a process called “development.”</p> <p>Long tunnels or “drifts” lead into the orebody where the “production” mining happens.</p>
<p>Safety procedures and/or training</p> <p>See rock bolts, shotcrete applications etc</p> <p>See ventilation systems</p>	<p>Risk management is critical in an underground mine and our focus on safety and control drives every choice.</p> <p>Each opening in the mine must be supported to withstand the pressures of the earth around it. and Every workplace must be safely ventilated to clear fumes from blasting and exhaust from equipment.</p>
<p>Drilling and blasting operations, at the face, see jumbo in action</p>	<p>We have to drill and blast the rock face to get at the richest ore.</p>
<p>See preliminary ore removal, then back-fill</p>	<p>The ore is hauled away for processing by huge machinery and remaining empty areas are back-filled.</p>
<p>See ore haulage</p>	<p>Moving tons of broken ore from several kilometers underground up to the surface is a massive process using rail, conveyors and trucks.</p>
<p>Remote mining machinery, especially new remote drills and jumbos</p> <p>Computer interfaces in heavy equipment cockpits</p> <p>Emphasize high-tech solutions, mining is not all manual labour</p> <p>Various “people” shots, seek diversity</p>	<p>Modern mining is a high-technology activity where sophisticated machinery takes the place of muscle power.</p> <p>Our focus on safety and sustainability has led Vale to develop some of the world’s most advanced underground mining technology.</p>

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<p>See "old" field geology footage</p> <p>See Sudbury history shots</p> <p>See mine planning... emphasize high-tech modeling</p> <p>Beauty shot of earth, see positive "new" energy, windmills, hybrid cars, etc.</p>	<p>What began with a prospector discovering a mineral has now developed into one of the world's most sustainable mining ventures.</p> <p>Underground mining will continue to be productive as new mining methods take Vale's base metals business ever deeper into the earth.</p> <p>Ongoing exploration, both within our active mines and at our new sites around the globe, will allow us to meet the growing demands of tomorrow's world.</p>
<p>Title rundown</p>	<p>To learn more about how we are transforming mining, please watch the other videos in this series.</p>
	<p>Music out</p>