

A Portal to the Future

Thompson Manitoba was founded on nickel. The Birchtree Nickle Mine was established in the 1950's but by 2007 it looked like the end was near and then a new body of high grade ore was discovered.

As the ore volume and mining capacity exceeded the capacity of the existing shafts and hoists new methods for retrieving the ore from deep underground were required.

It was decided that the most economical method to access and retrieve the ore was to construct a 610 metre long tunnel at a 15% grade and then haul the ore up in large mining trucks. As the upper 162 metres of tunnel passed through a zone of clay and fractured rock it was necessary to support this portion.

The owner, Vale Inco, established critical dimensions for the drift which determined the size and shape of the portal. Not only did it have to accommodate the haul trucks but an array of electrical, mechanical and ventilation conduits. As safety is paramount in mining, escape shelters or Safety Stations for 2 to 3 miners were required at 30 meter intervals along the portal length.

The mine portal was constructed with a two radius Deep Corrugated Structural Plate (DCSP) arch with a span of 6320 mm and a rise of 5630 mm. Four different plate thickness' of galvanized steel and two bolt diameters were used to carry the progressively increasing heavy dead load. A maximum cover of approximately 18 metres was accommodated where the DCSP was keyed into the solid rock tunnel below.

The structure was backfilled in the "critical backfill zone" with well graded and compacted select processed aggregate material. Processed aggregate by-product from the mine was used to complete the backfilling operation.



TRUCK ENTRANCE TO PORTAL WITH VENTILATION FAN OVERHEAD

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Careful monitoring and attention to detail during installation and backfilling operation resulted in a final shape structure that less than 0.5% changed from the design dimensions.

The innovative use of DCSP and efficient mining practices has given Thompson Manitoba a portal to the future.



CLAY OVERBURDEN STRIPPED AWAY TO ALLOW INSTALLATION OF 6320 MM SPAN X 5630 MM RISE X 162 M LONG DEEP CORRUGATED STRUCTURAL PLATE ARCH MINE PORTAL



THREE PERSON SAFETY STATION OF 2120 MM DIA. STRUCTURAL PLATE CORRUGATED STEEL PIPE (SPCSP) WITH REINFORCED BULKHEAD AND STIFFENER CHANNELS