



Reference Details

Owner Ministry of Transportation,
S2S Transportation Group/
Government B.C., Canada +++
Contractor Kiewit and Sons,
Richmond, B.C., Canada

DSI Unit DSI Canada Ltd., Western
Division, Surrey, Canada
DSI Scope Supply of newly
developed DCP Rock Bolts



Making Traveling Safer: Upgrading of the spectacular Sea-to-Sky Highway

DCP Rock Bolts successfully tested and installed at Sea-to-Sky Highway in BC, Canada

The Sea-to-Sky Highway is a scenic part of Highway 99 which offers spectacular views along its winding route from West Vancouver, BC, Canada to Whistler Mountain. It was first opened to traffic in 1962 as the major north-south connection through the Greater Vancouver Regional District.

The original road was built on steep cliffs as a two-lane highway which neither featured an outside barrier nor a concrete divider between the lanes. Since the road also becomes dangerously slippery in bad weather, British Columbia's Ministry of Transportation has decided to take action. The plans for redesigning and upgrading the highway were not only motivated by the wish to avoid accidents, they were vitally important in view of the many visitors expected to use this road during the Olympic Winter Games which will be held in British Columbia in 2010.

The new Sea-to-Sky highway will feature additional lanes, wider shoulders as well as new bridges.

Since the highway runs through areas which are highly prone to rock fall and exposed to inclement weather throughout most of the year, DSI, Surrey, BC, Canada developed a double corrosion protected (DCP) rock bolt designed especially to meet the difficult conditions of this project. This high capacity DCP Rock Bolt is tensionable over its full length via an expansion shell. In fact, this aspect is the main feature which distinguishes rock bolts from rock anchors. Rock anchors have to be longer since they have a distinct bond length, whereas another section of the anchor remains as "free length". Consequently, this type of DCP Rock Bolt has the advantage of being relatively short and light and is therefore easier to handle and to transport.

Another reason for the DCP Bolt's extremely light weight is the fact that the grout, which has to be placed between bar and corrugated sheathing and which is normally injected at the workshop, is now injected on site after the bolt has been installed and prestressed. This is a great advantage for handling rock bolts on steep slopes. The special thixotropic grout, which does not flow out of the borehole by gravity even when bolts are facing upwards, but moves only under pumping pressure and which is used to establish bond between bolt and rock and for corrosion protection, is injected in a single step on site. This saves time and makes installation quick and easy.

The robust anchor head of the bolt, a hot dip galvanized cast hemisphere with hexagonal anchor nut sitting on an angled galvanized plate, allows for an angle compensation of up to 25° between rock face and anchor inclination and can thus be easily adapted to the steep slopes of the Coast Mountains. Providing a most favorable seating for the nut and perfect support and centering for a stressing jack, this anchorage is very well adapted for the prestressing process of the bolt.

The anchor nut itself is protected by a corrosion protection compound and by a threadable, hot dip galvanized cast steel cap which offers complete long term corrosion protection, simultaneously shielding the anchorage against rock falls.

DSI is proud to have contributed to this important project with the new DCP Rock Bolt system, which was customized to meet the special demands for the improvement of the Sea-to-Sky Highway in B.C., Canada.

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