



CORRUGATED STEEL PIPE INSTITUTE

EXCEPTIONAL DURABILITY OF GALVANIZED CSP IN SOUTHERN MANITOBA

Mosasaurus, Plesiosaurs and Ossification

Eighty million years marked the end of the Mesozoic Era. It was a time when Manitoba was submerged in a tropical sea that connected the Arctic Ocean to the Caribbean. A time when dinosaurs roamed Alberta and giant Mosasaurs and Plesiosaurs swam in the Manitoba Sea. "Nessy" of Loch Ness fame is thought to be a long necked Plesiosaur. The fossilized remains of a more ferocious, 7.5 metre long, short neck version of Nessy was recently discovered near Morden Manitoba. www.mordenmuseum.com



Thirteen Metre Mosasaur "BRUCE" Hangs Out at the Morden Museum

It is speculated that at the end of the Mesozoic Era huge volcanoes filled the sea with clouds of mineral rich dust killing all life and burying the sea creatures under several metres of sediment. Through a process of ossification, body tissue, bones and teeth slowly transformed into fossils consisting largely of calcite or calcium carbonate (CaO_3). The fossils lay buried until the end of the last ice age, which ended 10,000 years ago. The scouring effect of the ice and later erosion exposed the long time hidden fossils along the escarpment that passes through Manitoba to the west of Morden.

The erosion process continues today as rain falls on the old sediments. The Red River flows North, over the ancient sea bed, picking up and depositing sediment and minerals as it goes. These are the same calcium rich sediments that created the ancient fossils and contribute to **"The Exceptional Durability of Galvanized CSP in Southern Manitoba"**.

EXCEPTIONAL DURABILITY OF GALVANIZED CSP IN SOUTHERN MANITOBA

Galvanized Corrugated Steel Pipe was first manufactured in Manitoba in 1908. Culverts from that era to the present remain in service and are performing well today. It is not uncommon to find old salvaged pipe reinstalled at new locations, as roads are widened and improved. Attaching date plaques to Manitoba highway culverts, started in 1950s and continues as part of an ongoing monitoring programme.



Protective Scale on Older Culvert



Date Plaque on Highway Culvert

The key to the exceptional durability of CSP in Southern Manitoba is the water. Today's water is not unlike the hard calcium carbonate rich water that created the fossils. Calcium carbonate is naturally attracted to the zinc that coats galvanized CSP. As water flows over the pipe surface, calcium attaches itself creating a natural build up or scale. This scale locks in the zinc and at the same time protects the zinc from corrosive elements in the environment. The scale is visible as a grey crust on pipe inverts below the water line. At some older installation inspection sites, where the crust was scraped away with a knife, the zinc is still shiny.

CSPI and NCSPA have developed models and methods for predicting the service life of Galvanized CSP in a variety of environments. For more information consult the "CSP Durability Guide" at www.cspi.ca or "The Handbook of Steel Drainage & Highway Construction Products".

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