



Geographical location

Confederation Bridge spans 12.9 km across the Northumberland Strait and provides a permanent link between Cape Tormentine, New Brunswick and Borden, Prince Edward Island.

When it began or was completed

Investigation, design and construction was carried out over 44 months. Assembly of the bridge was carried out over 11 months. Confederation Bridge officially opened in June 1997.

Why a Canadian geotechnical achievement?

When constructed, Confederation Bridge was the world's longest bridge over 'ice-infested' waters. The project is unique in that it was one of the earliest use of design, build, operate, and transfer project delivery in Canada. The bridge fulfilled a 100-year aspiration and promise of Canada to physically link Prince Edward Island to the mainland.

The foundation concepts for the bridge were developed by Keith Kosar and David Walter of Golder Associates, and were advanced with input from some of Canada's most renowned geotechnical engineers including Norbert Morgenstern, Jack Clark, Norman McCammon, Don Bassett, Victor Milligan, Dennis Becker and Ryan Philips. The ring footing foundation units had to be robust enough to withstand the harsh environmental conditions of the Northumberland Strait, yet economical and constructible within an unforgiving marine environment.

Key design issues included a bridge deck as high as 60 m above the sea water level, depth to seafloor up to about 35 m, large lateral and eccentric loads on the structures due to ship impact, wind, waves, and ice, complex geology and variable strength bedrock, and a short seasonal construction window due to ice and bad weather. The design used newly developed limit states methodology and was confirmed through numerical modeling, full scale field tests, and centrifuge modelling.

The bridge is operated by Strait Crossing Bridge Limited.

Submitted by

Keith Kosar (Kiewit Engineering Group), David Walter (Amec Foster Wheeler), and Dennis Becker (Golder Associates)

Key References

Kosar, KM, Burwash, WJ, Milligan, V and McCammon, NR. 1993. **Geotechnical foundation design considerations for the Northumberland Strait Crossing.**

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Kosar, KM, Walter, DJ, and Burwash, WJ. 1994. **Design of foundations to resist high lateral loads for the Northumberland Strait Crossing.**

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Photographs



After completion of construction (1998).



Construction of large diameter battered drilled concrete shafts for approach spans (1994-1995).