

Technology Today

Alan Pierce

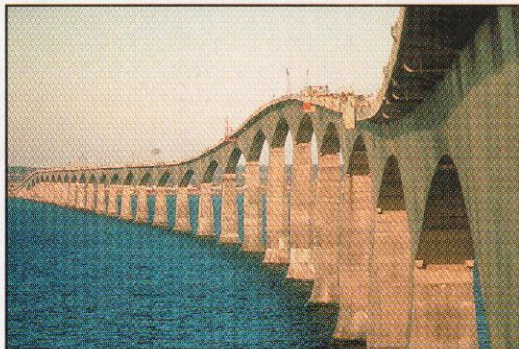
A Bridge over Troubled Water

ON June 1, 1997, the Confederation Bridge opened, spanning the Northumberland Strait that connects Prince Edward Island to New Brunswick, Canada. The Confederation Bridge—now one of the longest continuous bridges over a single body of water (8 miles long)—is the first bridge to be built totally relying on GPS technology. The magnificence of this bridge (see photo) is enhanced when you know that it has been built in an area where mountains of ice are the norm from December to April. It will most likely hold the title as the bridge over the most troubled water until the proposed Alaska-Siberia Bridge is built during the 21st century.

Because of New Brunswick's frequently adverse weather, the construction consortium designed the bridge to be built off site in sections and then assembled on site using GPS satellite positioning technology. This engineering project required the construction of 185 main structural elements on land for eventual placement in or over the water. Each piece needed to be placed exactly in the correct position. The entire 8-mile span only had room for a few inches of error. To understand the complexity of this placement you must realize the consortium needed to place 44 prefabricated piers (each weighing about 4,400 tons) in perfect alignment or the rest of the bridge wouldn't assemble. To accomplish this level of accuracy, several GPS systems were used in tandem, and they provided accuracy to within one quarter of an inch.

To protect the piers from the mountains of ice, the construction consortium designed and constructed special cone-shaped steel shields that surround the base of each pier. With a maximum height of 197', the view from the bridge is fantastic for walkers. The Strait Crossing Development Inc. consortium needed to protect drivers from the wind wash and wind shear of the area so they designed each 550' span with its own built-in, prefabricated 5' guardrails. Only travelers in high vehicles and buses will be able to see the view during their bridge crossing.

For its sheer majesty, the Confederation Bridge is the bridge to see. You can



Photograph of Confederation Bridge from Prince Edward Island, Canada, by John Sylvester.

find out more about the Confederation Bridge and the best time to visit as a tourist at www.gov.pe.ca.

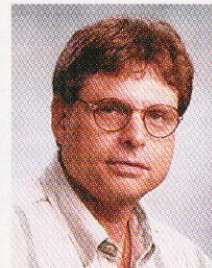
As a sidebar to this month's column, Akashi Kaikyo—the world's longest suspension bridge—currently holds the title as the bridge over the most troubled land.

Designed to withstand an earthquake of 8.5 on the Richter scale and standing only 2.5 miles away from an earthquake fault line, this bridge connects Japan's Hoshu to the much smaller island of Awaji. During construction, on January 17, 1995, an earthquake that measured 7.2 on the Richter scale hit the bridge. As a result of this earthquake, the Akashi Kaikyo Bridge added 2.6 feet to its length. It is now 2.43 miles long (12,828 feet). **TD**

Recalling the Facts

1. Why did they use GPS technology during the construction of the Confederation Bridge?
2. What major environmental problem had to be taken into account when building the Confederation Bridge? When building the Akashi Kaikyo Bridge?
3. Why was the Confederation Bridge built with high, solid guardrails?

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