

The Fort York Footbridges in Toronto. The first Duplex Stainless-Steel bridges in North America

Juan A. Sobrino

President, PhD, PE, PEng, ing,
ICCP

PEDELTA

Toronto, Ontario, Canada
jsobrino@pedelta.com



Founder and President of PEDELTA.
He is the designer of over 400
bridges of all sizes and types,
including cable-supported
structures, arches, segmental
bridges, GFRP bridges and seven
stainless steel bridges.

1 Abstract

In April 2015, the city of Toronto selected a proposal for the Fort York Pedestrian and Cycle Bridge project in a design-build competition. The project is located just west of the main downtown area of Toronto and provides a key link between Stanley Park to the north and the historic area of Fort York – the birth place of Toronto- crossing two rail corridors. Construction started in August 2016 and inauguration is expected by June 2019.

The project includes two pedestrian bridges. The awarded design proposal includes an unprecedented technical innovation in North America: the use of Duplex Stainless Steel on the entire structure. This pioneering use of a forefront technology provides premium aesthetics within a unique setting in addition to a safe and durable asset for the community. The structure has an extended life cycle, is more corrosion-resistant and requires less maintenance, reducing its overall cost.

Each bridge is supported by a single arch rib inclining at 18 ° to provide a slender, transparent, and elegant impression. The two arches tilt in opposite direction, and the overall layout resembles a Yin & Yang shape to emphasize both contrast and continuity, expressing a modern, understated and elegant aesthetic.

This paper discusses the concept, detailed design, structural behaviour and bridge erection.

Keywords: Bridge; Stainless-Steel; Arch; Aesthetics.

2 Duplex Stainless Steel

Stainless Steel is the name given to a family of corrosion and heat resisting steels with a minimum content of 11% Chromium and other controlled alloying element additions, each affecting the mechanical and chemical attributes to resist different corrosive environments. Stainless Steel is recognized as a sustainable material with a lower environmental impact than Carbon Steel (reduced

CO₂ emissions due to fabrication, lightweight construction and low maintenance and deconstruction cost over the bridge lifespan) and one of the highest recycling rates of any material.

Stainless steels have been used in a variety of structural engineering applications ever since they were invented one hundred years ago and are ideally suited for a variety of uses. In addition to excellent durability, they can exhibit high mechanical properties. Stainless steels are primarily