

## SUSTAINABILITY AND VISUAL CONSIDERATIONS FOR FOOTBRIDGES DESIGNED WITH STAINLESS STEEL

### Case Study: Garrison Crossing in Toronto, Canada.

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**Keywords:** Stainless steel; GFRP; aesthetics; sustainability, life-cycle cost.

#### Summary

Despite the impact that stainless steel has had in the architecture, industrial applications and multitude of consumer products for more than 50 years, its presence in civil engineering structures is recent. Some interesting structures, mainly pedestrian bridges, have been built in the last two decades. Stainless steel creates a light, strong, corrosion-resistant, and elegant structure with premium aesthetics. The extended structure life-cycle typically offsets the higher capital cost of stainless steel due to the increased corrosion resistance and reduced maintenance, which in turn reduces the overall cost of ownership. This represents a net advantage for the asset owner and improves safety and long-term durability. Stainless steel is recognized as a sustainable material with a lower environmental impact, lightweight construction, and low maintenance and deconstruction cost over the bridge lifespan. Stainless steel is one of the highest recycling rates of any material.

This paper provides an overview of the sustainability and visual considerations for footbridges designed with stainless steel through a recently built example: the Garrison Crossing in Toronto.

**Keywords:** design, aesthetics; new materials; stainless steel, arch.

### Garrison Crossing – North-America's first bridges in duplex stainless steel

Garrison Crossing was needed to enhance accessibility and foster connectivity of expanding communities around the historic setting of Fort York (the birthplace of Toronto), providing a new pedestrian and cyclist link to the Waterfront in Toronto. The project is not just simply a new addition to Toronto's physical infrastructure. It is a social device that promotes sustainable human interaction with one's environment and emphasizes the cultural heritage of the City. The project features two bridges crossing two of Canada's busiest rail corridors west of Fort York and pathways provide enhanced connectivity through these open spaces, offering cyclists and pedestrians a pleasant alternative to busy City streets. The bridges utilize duplex stainless steel for the entirety of the structure: an unprecedented technological innovation in North America, providing a durable long-term asset with premium aesthetics for the community. The bridges incorporate high quality, durable, natural finish materials throughout, highlighted by state-of-the-art stainless steel components, complemented by contrasting traditional materials including wood, weathering steel, and stone.



Fig. 5. North Bridge looking South.

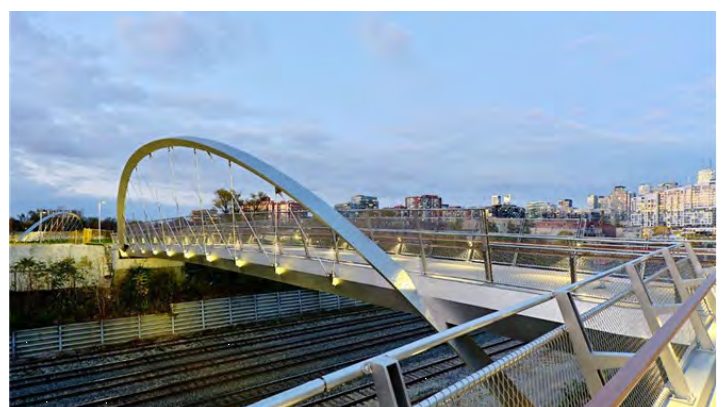


Fig. 6. Typical Cross-Section