

# DUPLEX STAINLESS STEEL - A MATERIAL FOR BOTH THE FUNCTIONAL FOOTBRIDGE AND THE SPECTACULAR LANDMARK

Anders Finnås  
 Manager New Applications  
 Outokumpu Stainless AB  
 Degerfors, Sweden

Béla Leffler  
 Senior Applications Engineer  
 Outokumpu Stainless AB  
 Degerfors, Sweden

## Summary

Traditionally stainless steel has seen very limited use in structural engineering applications. In footbridges the standard materials have been carbon steel, concrete or wood but lately more modern materials such as stainless steels and GRP has come into use. Since the first all-stainless footbridge was built in Stockholm in 2002 a number of stainless footbridges has been built. This development has been made possible by the use of high strength duplex stainless steels for load-bearing parts of the bridges.

Although in many cases thought of as expansive high profile materials stainless steels, and especially the duplex stainless steels, are suitable for most types of footbridge when durability and low maintenance costs are important considerations. The use of high strength duplex stainless steels gives design engineers and architects the possibility to produce attractive footbridges in designs that range from the everyday functional to the spectacular landmark while still being durable and cost-effective parts of infrastructure.

**Keywords:** footbridge; materials; duplex stainless steel.

## 1. Introduction

Historically, the use of stainless steel in structural engineering applications such as pedestrian bridges has been limited. On the other hand stainless steel has been frequently used in demanding industrial applications, such as Chemical or Oil & Gas industries, but also for cladding and facades for highly prestigious building projects such as Petronas Twin Towers in Malaysia.

Traditionally footbridges have been constructed in carbon steel, concrete or wood but lately more modern materials such as stainless steels and GRP has come into use. Combinations of stainless steels with other materials such as GRP, concrete and carbon steel have been used for bridges in the last years. The first all-stainless footbridge was built in Stockholm in 2002 and a number of other footbridges have been built using stainless steels, see Table 1.

*Table 1 Footbridges built using duplex stainless steels.*

Year	Bridge
2001	Millenium bridge, UK
2002	Apaté bridge, Sweden
2003	Paserela Padre Arupe, Spain
2004	Likholefossen bridge, Norway
2006	Holyhead bridge, UK; Siena bridge (Ruffolo), Italy

Footbridges are parts of the general infrastructure of the community and as such should fill their long-time function within the local transportation network at a reasonable cost. Design life is often in the range of 80 –120 years and consequently this requires that future maintenance costs be considered during the planning stage. With this time range in mind both the costs and environmental impact of the investment must be considered on a life cycle basis. This implies that such