



Design of an aluminium bicycle path integrated in a steel bridge

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Summary

This paper describes the design of the aluminium structure of a bicycle path which is mounted on an existing steel bridge. The benefits of aluminium, being low self weight, freedom in design obtained by extrusion and good corrosion resistance were maximal utilized. One of the main drawbacks of aluminium, being the low modulus of elasticity, caused that special attention was paid to stability and vibration of the deck. The paper shows how structural aluminium and steel can be combined in one structure.

Keywords: aluminium structures, thermal expansion, dynamic behaviour, extrusion

1. Introduction

The existing steel arc bridge over the Amsterdam-Rijnkanaal near Maarssen, the Netherlands, with a main span of 120 m, had to be renovated (figure 1, left hand side). The bridge spans an important Canal and a railway. One of the renovation aspects was to broaden the existing bicycle path.

The old bicycle path consisted of a concrete deck supported by steel cantilevers of the crossbeams of the bridge, with a distance in between of 8 m (figure 1, right hand side). As the load-bearing capacity of the cantilevers is limited, a wider bicycle path could not be constructed of concrete and the maximum width obtained with a steel structure was still too small. Therefore, an aluminium structure with a low self-weight was designed and constructed.

Because of the tight oxide layer that forms on the outer surface when exposed to air, aluminium structures are relatively insensitive to corrosion and the designed structure is not coated. This reduces the maintenance costs.