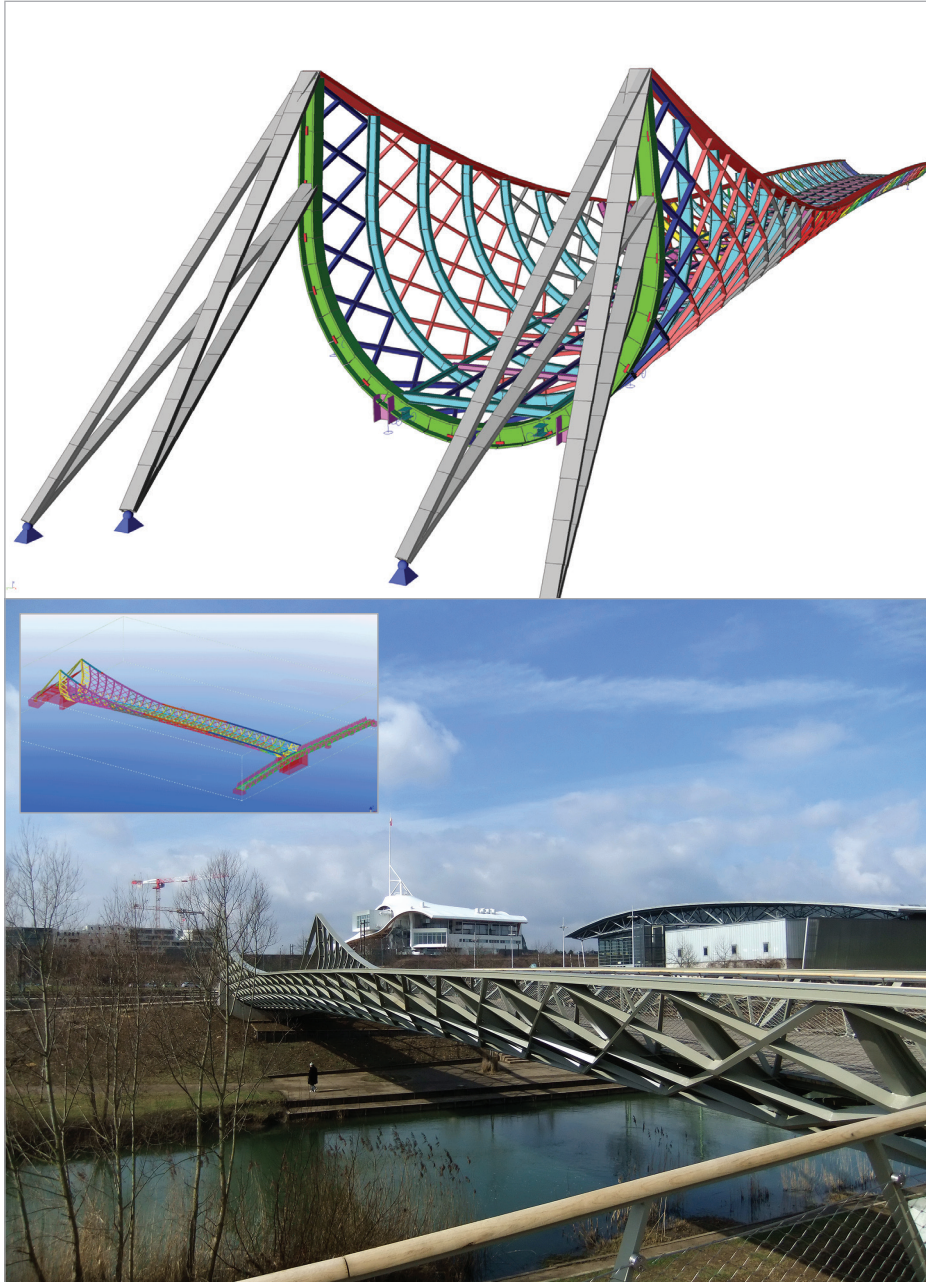


## Cyclist- and Pedestrian Bridge - Metz, France



Software: Scia Engineer

### Introduction

The cyclist- and pedestrian bridge in the centre of Metz crosses the river Seille in the contemporary Parc de la Seille. The bridge is officially known as the passerelle de Graouilly. The name refers to the mythical animal that is the symbol of Metz: the dragon.

The 64-metre-long bridge has a changing width from 8.7 m to 8.4 m and a changing height from 7.5 m to 6.8 m. The total weight of the bridge is 100 tonnes. The bridge has several cross girders in the form of a "U". These cross girders are connected by crossing rectangular diagonals. The net of diagonals is in equilibrium with a box-formed top girder that is anchored on 1 side of the bridge to limit the deformation of the bridge. The bridge is placed in one piece in its final place.

### Description of technical questions to be resolved with Scia Engineer

ESA-Prima Win was used both for the dimensioning of the bridge in the traffic situation and the erection engineering of the bridge.

The complex 3D structure was modelled in Scia Engineer with bars. The possibility of input of 2D dxf files in Scia Engineer was a big advantage so as to form the 3D structure in Scia Engineer exactly. Sufficient points were created in the bars to form the curved cross girders by linear bars.

From the engineering point of view this project has several challenges.

First, there was the complex form of the bridge. The possibility of user-friendly input by Scia Engineer was a big advantage. The use of 2D dxf files made it possible to compose the 3D structure in Scia Engineer in a rapid manner.

Second, there was the dynamic analysis of the bridge. Because of the light and slender character of the bridge there was the need to calculate the eigenvalues / frequencies of the bridge in order to check if there were risks of vibration under pedestrian load or wind actions. The possibility of calculation of accelerations due to passing pedestrians in Scia Engineer was a big advantage.

Third, there was the second order calculation needed for the check of the box-formed top girder based on a stability calculation. The twisting form of the girder (referring to the dragon) and the elastic support of the cross girders gave a complex stability form that was used as input for the second order calculation.

Fourth, the evaluation of deformations during the construction phase. The bridge was lifted in one piece to its final position. The choice of the position of the lifting lugs was important in order to evaluate the deformation of the bridge during positioning.

### Description of how our experience with Scia Engineer proved its completeness

- Dimensioning a complex 3D structure in Scia Engineer by input of 2D dxf files.
- The possibility of using and combining the results of Scia Engineer in a flexible way.
- Stability calculation and second order calculations based on a complex stability form.
- Checking the dynamic behaviour of the structure by calculating the eigenvalues and the accelerations of the structure.

This project proves the great diversity of Scia Engineer in checking the structure.

Modules used:

- Base
- 3D frame
- Dynamics
- Steel code check (EC)
- Stability

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## Integral quality is our top priority

Stendess calculates and draws complex steel constructions in a high quality and efficient manner while seeking economically responsible and sustainable solutions for specific technical stability issues. Thanks to the integral service, whereby the design of the metal superstructure and the concrete substructure are calculated and drawn by experts in the same office. The building owner and principal contractor retain 100% control over the complete structure.

Managing complex projects with care.

Recent references demonstrate the multidisciplinary knowledge and ability of our engineers and designers in the market of bridges, industry, utility and other projects located all over the world.

## Project information

Owner	Ville de Metz
Architect	Brigit de Kosmi
General Contractor	Anmeco N.V.
Engineering Office	Terrell S.A.S. / Ingenieursbureau Stendess N.V.
Location	Metz, France
Construction Period	2010 to 2012

## Short description | Cyclist- and Pedestrian Bridge

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