Constructa Ltd

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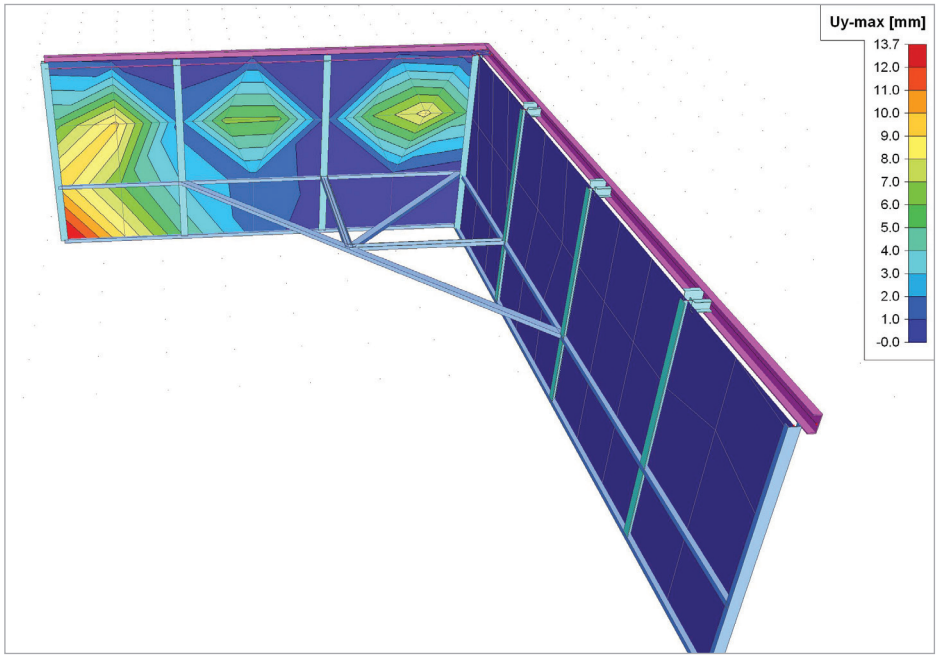
Constructa Ltd is a structural design agency, established in Ruse, Bulgaria. Since its foundation in 2001, the company consulted, designed and controlled the construction of a lot of residential, public and industrial buildings, facilities, special structures. We are specialized in untraditional steel structures, seismic stability, and reconstruction of existing buildings. Our team consists of 6 people - structural engineers and technical staff, we work in collaboration with architectural and installation design agencies, building companies, geology research companies, restoration specialists, etc. We usually insist on being a partner at the very beginning of the design process, but we often have to deal with predefined technical, economical or artistic solutions. Though we believe that the structural aspect is of primary importance in construction, sometimes our "structural" approach is subjected to pressure, torsion… These difficulties usually develop untraditional solutions. Our general policy is to understand and evaluate the aims and problems of all the participants in a construction initiative. We do our best to investigate different possibilities and present the owner with reliable information, so that the most adequate decision is taken.



Software: Scia Engineer

Renovation of Station Transit Zone 'San de Senart' - Paris, France

Description of the project

The municipality of San de Senart, Paris, together with the French railway company, planned the rehabilitation of a public parking at a train and subway station. The idea was to make it more comfortable and attractive for the passengers. New lifts, stairs and ramps were added. We dealt with steel structures in this project.

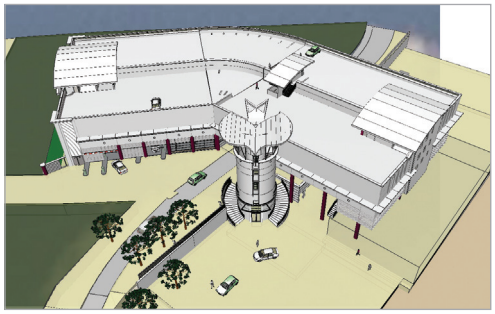
These are many relatively small structures, meant to protect the interior from sound, light, wind, snow, etc. and also to decorate the building. Here we will refer to two of these structures - the so-called "pignons" and the sun-guarding hangings.
A "pignon" is a kind of a pediment. It is situated about a meter away from the actual elevation. In fact this is a perforated aluminum covered deflection screen, 12 m wide and 14 m high. It is inclined and curved.
The sun-guarding hangings consist of vertical supporting structures and horizontal aluminium shells.

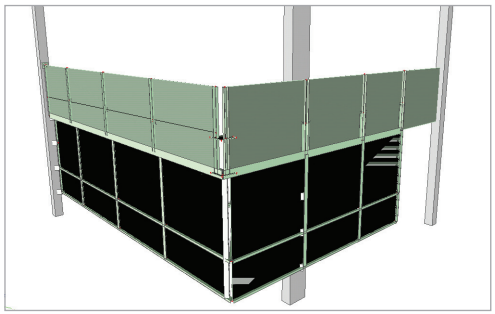
Challenges

Some of the problems were caused by the combined ownership. The parking garage spans two streets and the train station itself. We had to keep all structures a meter above the train station and above the ground - no foundations or anchorage allowed. Every steel structure had to be attached to the existing concrete structure.

The task got more complicated by the fact that the structure is prestressed. There was a small area for the anchors, restricted in height in a floor between the prestressing cables and in width between the concrete panels of the elevation. That makes it 80 / 80 mm per floor and per 3 m length.

Other problems came from accessibility. The train station was not to be closed during the construction process, neither were the streets. So the mounting of both the pignons and the hangings had to be done without a crane. All separate elements should be light enough to be lifted by a pulley.





Solutions

For the "pignons" we designed a separate spatial structure, consisting of four vertical trusses and inclined front beams. Thus we created a rectangular mesh for the perforated aluminum panels. The trusses are anchored to the floor beams in the hole between the concrete panels.

With the help of Scia Engineer we designed the steel structure and obtained data about the anchoring forces and their effect to the existing structure. We anticipated the great effect of temperature loads, but the results were a surprise. We made the conclusion that temperature loads are most essential for the design of any secondary outside structural elements.

The sun-guardings at the east end of the building are situated above the train station. As we couldn't go lower than one meter above the station's roof, we had to choose for a cantilever hanging of 4 m in height. Anchoring is allowed at the columns - 9 m opening, at the angles 3 m cantilever floor beam. Our solution was to foreseen vertical supports, combined by a horizontal triangular truss, situated 2.5 m above the station. With the help of Scia Engineer we investigated multidirectional wind loads to ensure stability and evaluate the deformations.

Renovation of Station Transit Zone ‘San de Senart’

Paris, France

Project information

Owner	San se Senart, Commune combs la ville
Architect	Levincent-Samson Eurl
General Contractor	Magnac freres
Engineering Office	Constructa Ltd
Construction Period	From November 2009 to June 2011
Location	Paris, France

Short project description

The municipality of San de Senart, Paris and the French railway company planned the rehabilitation of a public parking at a train station. We designed relatively small steel structures, meant for protection from sound, light, wind, snow, etc. and for decoration. The “pignons” (pediments) are situated a meter away from the actual elevation. These perforated aluminum covered deflection screens, 12 x 14 m, are designed as separate spatial structures, consisting of vertical trusses and inclined front beams. The sunblind hangings are vertical supports, connected by a horizontal triangular truss and aluminum shells.