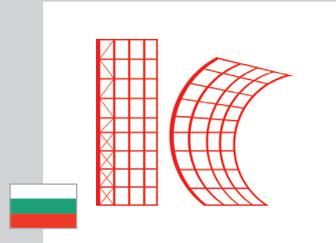


Constructa Ltd

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Constructa Ltd is a structural design agency, established in Ruse, Bulgaria.

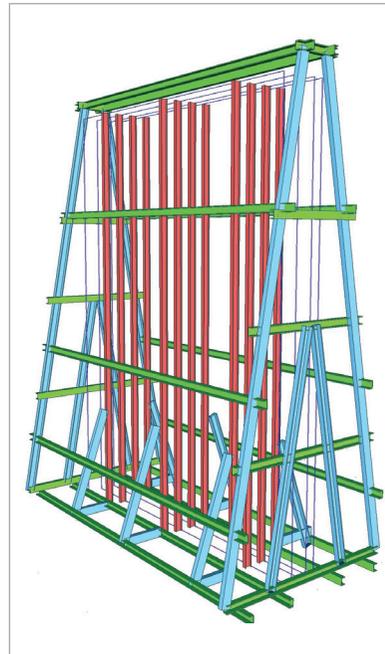
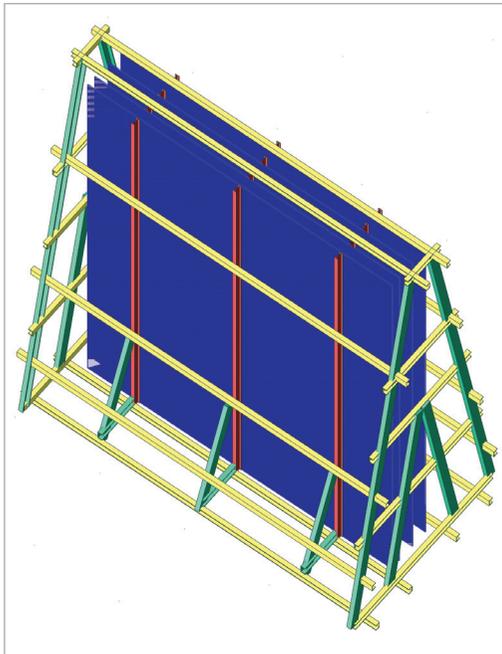
Since its foundation in 2001, the company provides structural consulting to public and private companies.

We have good experience in the chemical industry; we worked a lot with physicists, chemists, technologists, physicians, etc. In such projects a structural engineer has to be really inventive and at the same time strictly observe the technology rules. The structural design agency should gather and assimilate a lot of

specific information and carefully sift it to extract all the details that affect not just the structure but the entire construction process.

A very important aspect of the industrial design is adapting the technological know how to the local geophysical and climatic conditions and norms.

We are trying to do our best to provide reliable and adequate collaboration to specialized industrial and social initiatives.



Software: Scia Engineer

Radiation Therapy Complex - Plovdiv, Bulgaria

The oncology centre in the region of Plovdiv, with the support of the municipality of Plovdiv, planned an extension to the local hospital. A radiation therapy complex of about 1.300 square metres of total area was designed.

The existing building consisted of public zones for patients and specialized zones for medical equipment.

We designed the public zones more or less traditionally - concrete structures, 9 degree seismicity by the Medvedev-Sponheuer-Karnik scale, stairs, elevators, shades. The blocks for radiation therapy, bulky and heavy structures, had to act together with the slimmer common structures.

There were three levels of protection from the radiation sources - for the personnel, for the adjacent parts of the hospital and for the environment. In this case the radiation physicists chose unified protection method - steel screens for both the roof and walls.

Challenges, specific experiences

Unlike other cases in which the structural elements seem too big and too expensive to the owners, this time the elements of the bunker were too big for us, the designers. The walls are 2.1 m, 1.6 m, 1.4 m thick. The roof slab is 1.5 m thick with a 0.33 m steel implant in the middle.

With the help of Scia Engineer we designed the roof slab that is cast in three stages. After the first stage the steel implant is mounted.

The specific task in this project was to include the steel screens into the walls. These are 0.1 m thick vertical steel plates placed inside the walls. One wall had a single screen in it and the other two - 3 separate screens with a distance of 0.1 m from each other. The size of the screens was 3.70 x 4.65 m. We designed supporting structures for these steel screens. Their function was to fix the vertical position of the plates, to redistribute the load to the concrete wall below and, most important, to allow for strict tightening so that no bubbles of air remained between the individual plates.

Firstly, the basic horizontal frame has to be leveled and fixed to the concrete base.

Secondly, the exterior verticals and diagonals are to be mounted.

The next stage is to cover the outer verticals with steel plates sized 1 x 0.5 x 0.01 m and fix them.

Thus something like a cage is formed. In this cage two primary screens of 10 mm steel plates and supporting vertical profiles are mounted. The verticals function as guides for disposing all the necessary plates.

Tightening ropes go through no more than two separate plates, otherwise a channel for radiation leakage might be formed.

The use of Scia Engineer

In Scia Engineer we checked the supporting structure for every stage of assembly of the steel plates, and we also used it to illustrate the process. Due to its easy use and attractive graphical output, we often use Scia Engineer pictures and supplementary models as a 3D illustration of the general idea, like angular retaining walls, stairs, geometrically complicated architectural elements, etc.

The project got a building permit in December 2010. The building company has not yet been chosen. The construction is to start in 2011.

Project information

Owner Regional Oncology Complex, Plovdiv
Architect Ventsislav Iliev
Engineering Office Constructa Ltd
Construction Period From April 2011 to April 2012
Location Plovdiv, Bulgaria



Short project description

The project is about the extension of the Plovdiv Oncology Centre, more specifically a radiation therapy complex of about 1.300 m². The building consists of public zones for patients and specialized zones for medical equipment. The walls of the radiation therapy blocks are 2.1 m, 1.6 m and 1.4 m thick. The roof slab has a thickness of 1.5 m with a 0.33 m steel implant in it. The chosen radiation protection method includes steel screens in walls and slabs. Specific supporting structures were designed for the process of mounting the steel plates of the screens in the walls.

