

Technical Description

With the STRUCTURAL DESIGN for CULTURAL CENTER structure in Mosna, Municipality of Majdanpek.

DESCRIPTION OF STRUCTURE CONSTRUCTION

To take the vertical loads and their transfer to other structural elements (beams, pillars and foundations) the reinforced solid panels 16 cm thick have been designed, while, at the part above the garage at elevation +4.42, the full thickness of the panel is 20cm. A floor panel of the ground floor has been designed as a floating plate, 12cm thick, except for the garage where it is 16 cm thick and its entire surface rests on a properly loaded tampon layer of gravel with a minimum compression of 20MP. Vertical support elements of the construction are AB pillars 20cm and 30cm wide in the hall and are variable in length, which was adopted from the terms of the ductility of each pillar, by the floors. Vertical communication is carried out by two staircases, the first one in the garage and the other, the capital one, in the central part of the structure. Static system of the staircase is a one-way bearing crank panel.

Reinforced concrete pillars, placed in two orthogonal directions that are at a floor level interconnected by a reinforced concrete beams and reinforced concrete floor panels, take part in receiving the horizontal forces of seismic and wind. During seismic analysis we considered two dominant directions of earthquake, which correspond to the global X and Y axes of a static model along with the defining the appropriate forms of the common oscillation structure.

In addition to the reinforced concrete structure, a steel structure as the supporting structure of the roof section above the hall was also treated. Dual-band steel lattice girders made of the box-shaped profiles in the axes 4 and 5 were designed. The roof layers are transferred to the grids over the trapezoidal tin and rafters. In axis 3, the rafters rely on a short element in the reinforced concrete beam that, with its geometry, corresponds to the roof planes. In axis 6, the rafters are left over reinforced concrete beams. The grid at its ends, in the axes D and E, rests on the reinforced concrete pillars.

The roof over the garage has been designed as a wooden four-sided roof. The bearing structure consists of carders which, at the mid-span, rest on the rafters that through the pillars transfer loads from the roof to the joists. Around the perimeter of the building, they rest on the reinforced concrete beams over the joist. Connect joists and pillars with tiers and screws that will allow the transfer of tension forces from the joists to the pillar. The roof is made of trapezoidal coated tin that imitates tile and which rests on the rafters between which is space for thermal insulation. Rafters, in one end, rest on a beam, in the middle on the rafter and at the other end on a carder.

FOUNDING

In accordance with the pressure of the structure to the ground, the shallow foundation of the structure on strip foundations was adopted. Strip foundations are of "T" cross-section. The adopted width of the contact dimension of the foundation is such that the stresses in the soil do not exceed 150 kN/m². The largest calculated settlement of the foundation is less than 7 mm.

LOADS

The structural elements are calculated on the combined effect of the vertical and horizontal loads according to the analyses of loads.

Vertical loads are divided into constant ones (net weight of construction, the weight of the flooring, partition walls, facades and the weight of the earth), useful loads (the load of the people and furniture) and a load of snow.

Horizontal loads impacting the structure are load of wind and seismic load. Regarding the weight and number of floors of the structure, as well as wind speed and wind exposure effect, the applicable horizontal effect is the earthquake effect. The calculation was made with the

adopted seismic coefficient of 0.05, the adopted 2nd category of the ground and 2nd category of structure.

CONSTRUCTION CALCULATION

Structure calculation was made on a computer by using software package RADIMPEX 3D modeling structure by the system final elements.

All the elements of RC structures are made of concrete MB30. They are reinforced by the reinforcement B500.

When making formwork and preparing for concreting, and before concreting, in areas where the opening in the panel will not be formed by making formwork, there should be planned mounting of "cores" for installations, in order to avoid any subsequent drilling of concrete and potential damage of the built-in armature. All openings in reinforced concrete elements that are larger than the project defined distance between reinforcement bars or that in any other way disturb the adopted position of the armature, and are not drawn in the project documentation, should obtain the approval of the Structural Designer.

The project was designed in compliance with the applicable rules, regulations and SRPS standards. The used regulation has been defined in technical requirements that are an integral part of the technical documentation

Place and date:
Belgrade, October 2017
Engineering
Stamp:

Responsible designer:
Igor Mitic, B.Sc. in Structure

Signature: