1. TECHNICAL REPORT

1.1. BASIC INFORMATION ABOUT THE OBJECT

The subject of this report is a social welfare centre building for patients with psychotherapeutic and psychosomatic problems. The object is located in Prague 10 – Strašnice. The object is connected to all technical networks, which are pulled along the adjacent road structure. There will be no changes caused by this construction to the surrounding building environment.

1.2. BASIS OF REALISATION

- Drawings and other documents made by architects
- EN 1991 Eurocode 1: Actions on structure
  - EN 1991-1-1:2002 General actions – densities, self-weight, imposed loads for buildings
  - EN 1991-1-3:2003 General actions – snow load
- EN 1992 Eurocode 2: Design of concrete structures
  - EN 1992-1-1:2004 General rules and rules for buildings
- EN 1996 Eurocode 6: Design of masonry structures
  - EN 1996-1-1:2005 General rules for reinforced and unreinforced masonry structures
  - EN 1996-3:2006 Simplified methods for unreinforced masonry structures
- ČSN ISO 13822 Principles of structural design – Assessment of existing structures
- ČSN EN 206 Concrete Specifications, properties and production
- ČSN 731201 Design of concrete buildings
- POROTHERM Catalogue for design of masonry structures (Wienerberger a.s., 2011)

1.3. LIST OF USED SOFTWARES

AutoCAD 2016 Student version

SCIA Engineering 17.01 Student version

1.4. BASIC CHARACTERISTICS OF STRUCTURAL SOLUTION

1.4.1. ARCHITECTURAL AND URBAN PLANS

The subject is a care centre facility with its ground plan divided into two parts, one smaller part with dimensions 5,5 x 16 m and one larger part with dimensions 16 x 22 m. These two parts share a masonry wall through 16 m of its length.

The building has a saddleback roof structure above the 4th above-ground floor of the larger part of the structure. The highest floor (2nd above-ground floor) of the smaller part of the structure is covered with a flat green roof structure.

The highest peak of the building is located in the height of 13,8 above the surrounding terrain's ground level.

The height of all above-ground floor is 3 500 mm, the height of the under-ground floor is 2 950 mm.

In the under-ground floor there are garage parking spaces and technical core of the building.

In the 1st above-ground floor the main entrance is located and within the whole area there are rooms intended for doctors, care-takers and special rooms for therapeutical sessions, as well as in higher floors.

1.4.2. TECHNICAL SOLUTIONS

The structure is founded on areal foundations: RC footings and stripes. The structural systém is combined of both wall system and column system.

The slab structures are made from monolithic RC. In the larger part of the structure the two-way slab is locally supported by RC columns. In the smaller part the one-way slab is supported by masonry walls.

The staircase is monolithic RC staircase, composed of 3 flights. There is also an elevator in the space between the staircase flights, surrounded by RC wall.

1.4.3. USED MATERIAL

The structure is designed as two materials combined: reinforced concrete and masonry blocks.

Foundations and under-ground floor walls: RC blocks, C 30/37 XC2, S3,

Columns, slabs, staircase: RC, C 30/37 XC1, S3,

Load-bearing walls of above-ground floors: burnt perforated bricks HELUZ FAMILY 44 with mortar MC5,

RC reinforcement: steel B500B.

1.5. LOADS

The numbers are of characteristic values. For obtaining te design values, the characteristic values must be multiplied by safety coefficients. For permanent loads 1,35, for live loads 1,5.

1.5.1. PERMANENT LOADS

Self-weight of RC structures is considered 25 kN/m^3. The weight of masonry load-bearing walls is 6,5 kN/m^3. Self-weight values of slabs are calculated in the static calculation, part *2.3.2. Loads accting on the vertical structure.* For further calculation the simplified and safe value of 1,26 kN/m^2 was used for permanent floor load (excl. the self-weight of the slab structure). The value of roof slab is 1,091 kN/m^2.

1.5.2. LOAD FROM PARTITIONS

The nonload-bearing partition walls are made from lightweight YTONG blocks. The weight of the partitions is 5 kN/m^3. The load was calculated on the most loaded part of slab, therefore all the calculated values should be safe even for other parts of structure.

1.5.3. LIVE LOAD

The live load considered on the case of typical floor slab is 1,5 kN/m^2 (category A – residential objects acc. to EN 1991-1-1). The roof is a inaccessible roof with live load 1 kN/m^2 (category H in EN 1991-1-1). For other parts of structure, if they were meant for assessment, the live load of 2,5 kN/m^2 would be taken for the garage parking slab and value of 3 kN/m^2 for staircase structures would be considered.

1.5.4. SNOW LOAD

The building is located in Prague (snow area n. I), the assessed roof structure is a saddleback roof and the terrain has normal topography, where no significant changes of snow load due to wind is expected. The snow load value was calculated as 0,448 kN/m^2 .

1.6. FOUNDATIONS

RC columns are founded on RC footings with dimensions 2,6 x 2,6 m, 0,95 m high. The walls are founded on stripes 0,9 m wide and 0,55 m high.

All of the foundation structures hold the anchorage reinforcement for concrete walls and columns.

Between the foundation footings and stripes there will be a concrete slab with depth of 200 mm. The slab will lay on leveling layer of concrete with depth of 90 mm.

1.7. LOAD-BEARING STRUCTURE

1.7.1. VERTICAL LOAD-BEARING ELEMENTS

The designed RC column dimensions are 300 x 300 mm. Theses dimensions were designed for the most loaded column in the under-ground floor.

The designed masonry wall dimension is 440 mm (thickness). The openings in the walls are depicted in the Structural drawing.

Detailed design of reinforcement of RC columns was not part of this particular project.

1.7.2. HORIZONTAL LOAD-BEARING ELEMENTS

All the typical floor slab structures are made from reinforced concrete and depth of the slab is 240 mm. In the larger part of structure the slab is supported by RC columns and masonry walls, without any beams. In the smaller part of the structure the slab is supported only in one direction by masonry walls.

In all slab structures there will be paths for water distribution, sewers and air conditioning. These openings of the structure don't need any static analysation, but will be reinforced around their perimeter according to the sorroundind reinforcement layout.

Reinforcement of all slabs will be done with steel B500B according to the detailed reinforcement design and drawings.

1.7.3. SLOPING LOAD-BEARING ELEMENTS

The staircase is made from monolithic reinforced concrete. The shape of surrounfing structure is dividing the staircase path into three parts, the staircase has three flights. There are two landings with depths of 240 mm, the flights have depth of 200 mm.

The staircase steps will be made together with the flight's slab. Their height is 175 mm and width 300 mm.

The flights are connected to the landings and at places of contact with surrounding walls they are separated from the wall by the dilatation zone.

The landings are supported by the RC wall and there is a possibility to use HALFEN boxes, due to acoustic insulation.

1.8. STRUCTURES' SECURITY AGAINST UNFAVOURABLE IMPACTS

1.8.1. FIRE SECURITY

Fire security of the RC structures is ensurred by sufficient dimensions of structural elements, as well as sufficient value of concrete cover depth (min. 20 mm).

Fire security of the masonry walls is ensurred by sufficient dimensions of structural elements.

1.8.2. RUST PREVENTION

RC tructures' resistence to corrosion is ensurred by sufficient value of concrete cover depth (min. 20 mm).

1.9. TECHNOLOGY OF CONTRUCTION

All the construction processes will be performed according to ČSN 73 24 00 for all the main processes of the construction, such as: transit and treatment of material, casing and formworks, reinforcement laying, masonry laying, taking care of visual appearance of the structure.

1.10. SAFETY OF WORKERS DURING CONSTRUCTION

All the parts of the structure were design according to the codes valid in Czech Republic. All the construction works will be performed by a specialist company. During the construction it is necessary to abide the rules related to all codes and laws valid.

It is necessary to have the local regulations for the particular construction site completed. These will be all explained in details to each of the workers.