

**CZECH TECHNICAL UNIVERSITY IN PRAGUE**  
**FACULTY OF CIVIL ENGINEERING**  
**DEPARTMENT OF GEOTECHNICS**



**TECHNICAL REPORT**  
**FOUNDATION PART**

**MALATHE KAMAL ALKHATEEB**

**NAME OF PROJECT**

RESIDENTIAL BUILDING IN PRAGUE

**CREATED BY:**

MALATHE KAMAL ALKHATEEB

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## **1. GENERAL INFORMATION**

Residential building in Letnany in Prague is designed. The building is located in the outer border area of Prague in a newly developed residential area. The residential building is designed economically and utilizing modern ways of design and construction. The project emphasizes on good quality. The project utilized orthogonal architecture to blend in with the surrounding. Czech and Euro codes were used during design.

## **2. BASIC INFORMATION**

The residential building has 1 underground floor and 5 upper ground floors. The size of the building is different in underground level and in upper floors. Underground level is 47,0 m long and 20,6 m. Height above the ground is 17.05 m. Height under the ground is 2,02 m. Total height is 19,07 m. The underground floor is equipped with a garage, technical room, washing machine room, drying room, rooms for storages. 16 parking spaces are located outside the building. Drive in to the building is from south. There are 10 apartments first level, 11 apartments in second till fourth level and 6 floor in fifth floor. Apartment is of different dispositions from 1+kc to 4+kc. The building consists of 49 apartment units in total. All the apartments are properly lighted. Underground level is bigger than upper floor, there is jump in the slab in the structural system of underground level to achieve the difference in section of first level terraces and apartments. Another recess of building shape is in the fifth level when the fifth level is smaller than others. The roof areas of fourth floor is used as terraces for fifth floor apartments. Building is also equipped with balconies. Entrance to the garage is from the level of outside street. There is no ramp. Underground level floor is in the same height as surrounding street level. Entrance to the building is from the intermediate level of staircase. It is one staircase wing downstairs to the garage and one staircase wing up to the apartment areas. In the entrance area there is common residential building equipment such as cleaning room and staller room. Underground floor is used mainly for parking, there is also storage areas and technical room. The building is not designed specifically for use of disabled people. Disabled people will be in the building not permanently, only occasionally.

## **2.1. SOFTWARE**

- AutoCAD 2018
- MS Office

## **3. STRUCTURAL SYSTEM**

Structural system of the building is combined reinforced concrete structure. Skeleton system is used in the underground level, upper floors load bearing elements are created from load bearing reinforced concrete walls. The building is founded on the combination of foundation slab of thickness of 250 mm and piles of diameter 600 mm and 900 mm. Due to the clay subsoil the load from the building will be mainly transferred through skin friction of the pile.

## **4. MATERIALS**

Concrete:

Reinforced concrete foundations

C25/30 - XC3, XD2, XA1 -  $d_{max}=22\text{mm}$  -  $Cl<2\%$  - S4

Reinforced concrete piles:

C25/30 - XC3, XA1 -  $d_{max}=22\text{mm}$  -  $Cl<2\%$  - S4

## **5. SURVEYING**

Several exploring probes have to be made during design phase or during first part of construction to confirm expected soil properties which are well known in this area and were used for the design.

## **6. FOUNDATION**

### **6.1. CHARACTERISTIC OF SOIL**

Clay F4 –angle of internal friction = 30 deg

Cohesion = 20 kPa

Gamma is = 20 KN/m<sup>3</sup>

Tabled load bearing capacity = 150 kpa

## **6.2. FOUNDATION SLAB**

The building foundation slab is designed as 250 mm thick and it is from waterproofed concrete with the additive XYPEX (used for closing the cracks in concrete after the crack arising XYPEX reacts with water and very slowly close the crack)

## **6.3. WATERPROOFING**

Waterproofing of the structure below ground is done by asphalt sheets in the places of weak spots, recess in the walls, opening for pipeline, etc.

## **6.4. PILES**

Piles are designed of two diameters, 900 mm and 600 mm. Diameter of 900 mm is used under the places of big loads (columns in the underground level) Diameter of 600 mm is used for example under perimeter wall of underground level or elevator shaft. Piles are design of different length. Under the places of big load, the piles are designed of length of 16 m to be able to carry all the load.

## **7. LIST OF ATTACHMENTS**

1. Structural calculation

## **8. LIST OF DRAWINGS**

1. Foundation drawing