

Ministry of Education and Science of Ukraine
National University "Yuri Kondratyuk Poltava Polytechnic"
Educational and Scientific Institute of Architecture, Construction and Land Management
Department of Architecture of Buildings and Design

RESIDENTIAL GROUP IN RABAT (KINGDOM MOROCCO)

Explanatory note

to the qualification work for the higher education degree of "Bachelor"
in the specialty "Architecture and Urban Planning"

402-Ai 18041 EN

Developed by a student of group 402-Ai
___ of June 2021 _____ Iktir I.
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Supervisor of the qualification work
___ of June 2021 _____ Shevchenko L.S.
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Consultant on architectural structures
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___ of June 2021 _____ Zyma O.Ye.
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Admit to the graduation paper presentation

Head of the Department of Architecture of Buildings and Design
___ of June 2021 _____ Nikolaienko V.A.
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Інститут Навчально-науковий інститут архітектури, будівництва та землеустрою

Кафедра кафедра архітектури будівель та дизайну

Освітньо-кваліфікаційний рівень бакалавр

Спеціальність 191 Архітектура та містобудування

(шифр і назва)

ЗАТВЕРДЖУЮ

Завідувач кафедри,

голова циклової комісії

Ніколаєнко В.А.

“ ” _____ 2021 року

ЗАВДАННЯ **НА ДИПЛОМНИЙ ПРОЕКТ (РОБОТУ) СТУДЕНТУ**

Ікрам Іктір

(прізвище, ім'я, по батькові)

1. Тема проекту (роботи) Residential Group in Rabat (Kingdom Morocco)

керівник проекту (роботи) Шевченко Людмила Станіславівна, к.арх., доцент

(прізвище, ім'я, по батькові, науковий ступінь, вчене звання)

затверджені наказом вищого навчального закладу від “ ” _____ 2021 року № _____

2. Строк подання студентом проекту (роботи) _____

3. Вихідні дані до проекту (роботи):

- завдання на виконання дипломного проекту;
- опорні матеріали по ділянці проектування;
- фотофіксація існуючого стану території

4. Зміст розрахунково-пояснювальної записки (перелік питань, які потрібно розробити):

- передпроектні дослідження території;
- містобудівне вирішення (функціональне зонування території, організація транспортно-пішохідної мережі, вирішення генерального плану, техніко-економічні характеристики генплану);
- архітектурно-планувальне вирішення будівлі (функціонально-планувальне, архітектурно-композиційне, техніко-економічні характеристики будівлі);
- розділи суміжних дисциплін (архітектурні конструкції, охорона праці);
- список використаної літератури.

5. Перелік графічного матеріалу (з точним зазначенням обов'язкових креслень):

Ситуаційні схеми (країни, регіону країни, міста, фрагменту міста, масштаб за узгодженням); опорний план ділянки забудови, М 1:1000, 1:2000; генеральний план об'єкта проектування, М 1:500; план першого поверху всіх типів будинків М 1:100; плани типових поверхів всіх типів будинків М 1:100, М 1:200; головні фасади всіх типів будинків М 1:100, 1:200; інші фасади всіх типів будинків М 1:200; вертикальні розрізи всіх типів будинків М 1:100, 1:200; перспективи всіх типів будинків; дендрологічний план внутрішнього двору; 2-3 види на внутрішній двір; 3-D вид на всю територію об'єкта проектування.

6. Консультанти розділів проекту (роботи)

Розділ	Прізвище, ініціали та посада консультанта	Підпис, дата	
		завдання видав	завдання прийняв
Арх. конструкції	Руденко В. В., доцент кафедри будівництва та цивільної інженерії		
Охорона праці	Зима О. Є., доцент кафедри будівництва та цивільної інженерії		

7. Дата видачі завдання - 22.02.2021 р.

КАЛЕНДАРНИЙ ПЛАН

№ з/п	Назва контрольних етапів дипломного проекту	Строк виконання етапів проекту (роботи)	Примітка
1.	Збори дипломників, зустріч з керівниками дипломного проектування. Затвердження наказом по університету тем дипломних проектів та керівників. Складання програми-завдання на дипломний проект. Доопрацювання теки вихідних даних.	22.02.2021-26.02.2021	
2.	Видача затвердженого кафедрою бланку завдання на дипломне проектування. Оформлення теки вихідних даних. Виконання клазур містобудівного та об'ємно-просторового вирішення об'єкта.	22.02.2021-26.02.2021	
3.	Розроблення ескіз-ідей містобудівного, планувального і об'ємно-просторового вирішення об'єкту проектування.	22.02 - 06.03.2021	
4.	Кафедральна (секційна) перевірка. Захист ескіз-ідеї містобудівного й об'ємно-планувального вирішення об'єкта проектування. Затвердження напрямку подальшої роботи	08.03 – 13.03.2021	
5.	Розроблення елементів ескізу. Плани, фасади, розрізи, перспективи, замальовки та ін.. Розроблення інтер'єру або елементів благоустрою.	15.03-20.03.2021	
6.	Розгляд комісією секції напрацювань: ескізу та схеми розташування креслень дипломного проекту на планшетах в М 1:5.	22.03-27.03.2021	
8.	Кафедральна перевірка. Попереднє затвердження ескізу	05.04-10.04.2021	
9.	Доопрацювання ескізів за зауваженнями комісії.	12.04-17.04.2021	
10.	Перша міжкафедральна перевірка: перегляд та затвердження ескізів у повному обсязі комісією інституту Допуск до подальшої роботи. Формування пояснювальної записки.	19.04.-24.04.2021	
8.	Друга міжкафедральна перевірка. Перегляд стану дипломного проектування комісією університету.	31.05 -05.06.2021	
	Дороблення проекту за зауваженнями комісії. Рецензування. Отримання рецензії.	05.06 – 12.06.2021	
9.	Здавання проекту і пояснювальної записки на кафедру. Допуск до захисту. Попередній захист	14.05 -15.06.2021	
10.	Захист КАП в ЕК	21.06 -26.06.2021	

Студент _____ Ікрам І.
(підпис) (прізвище та ініціали)

Керівник проекту (роботи) _____ Шевченко Л.С.
(підпис) (прізвище та ініціали)

INTRODUCTION

Rabat is the capital of Morocco.

The city is located on the Atlantic coast in northwestern Morocco, 40 km south of Kenitra and 240 km southwest of Tangier and the Strait of Gibraltar and 87 km northeast of Casablanca. It is separated from the city of Sale at the mouth of the Buregreg, hence their nickname "sister city".

Administratively, its territory, which should be distinguished from the Rabat agglomeration, including the 118.5 km suburb, corresponds to the territory of Rabat Prefecture, which, on its return to the principle of city unity in 2002, consists 8, on the one hand, of Rabat self-government, consists, on one hand, the city government of Rabat, divided into five districts; on the other hand, the city commune of Tuarga, where the royal palace is located, is enclosed in the first. At the last census in 2014, its population was 577,827, making Rabat the 7th largest city in the kingdom. With its suburbs, it forms the second largest agglomeration in the country after Casablanca. The city was founded in 1150 by the Almohads¹⁰, who built a citadel (which became the Kasbah of the Oudai), a mosque and a residence. Then it was what is called a fisherman ("fortress" 11). The current name comes from Ribat Al Fat, "Victory Camp". Later, Al-Mumin's grandson, Yakub al-Mansur, expanded and completed the city, including surrounding it with walls. It later served as a base for Almohad expeditions in Andalusia.

Since 2012, a set of monuments in Rabat has been included in the UNESCO World Heritage List. The city also received second place in the CNN ranking "Best Travel Destinations of 2013".

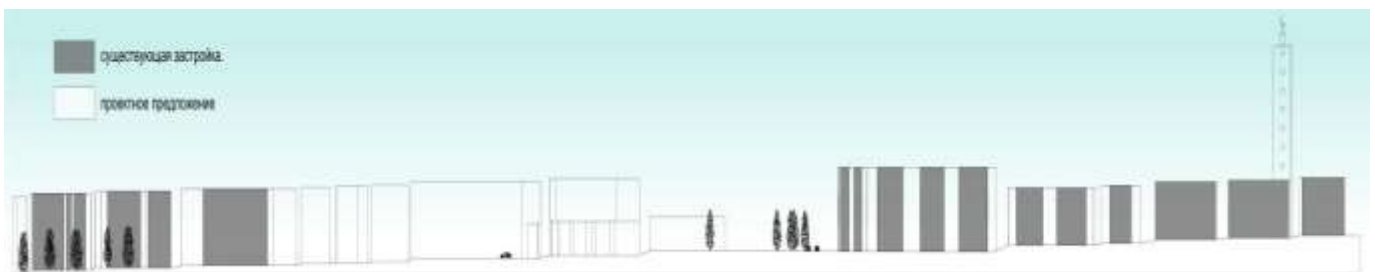
1. Pre-project studies:

The site of the projected complex is located in the city. Along the street Al Kifaah and street Chebanate. The plot has a size of 190m x 110m, located within walking distance to places of study. There is a polyclinic and shops nearby. The existing stop is located 100 m from the site. The design area is adjoined by spontaneous construction and industrial former and existing zones. In the neighborhoods surrounding the building, dominated by residential buildings of low and medium storeys. 3 example of this, it was concluded that the building on the territory should have the functions of housing (housing of higher quality) and leisure and recreation. In general, the complex is located taking into account the orientation of the city, relief, architectural and compositional solutions.

PROJECT OBJECTIVES:

- ☑ Creation of a comfortable environment of the class type, using all the advantages of the terrain.
- ☑ Increasing the value and economic level of the district.
- ☑ Solving social problems, including employment. Energy efficiency of buildings.

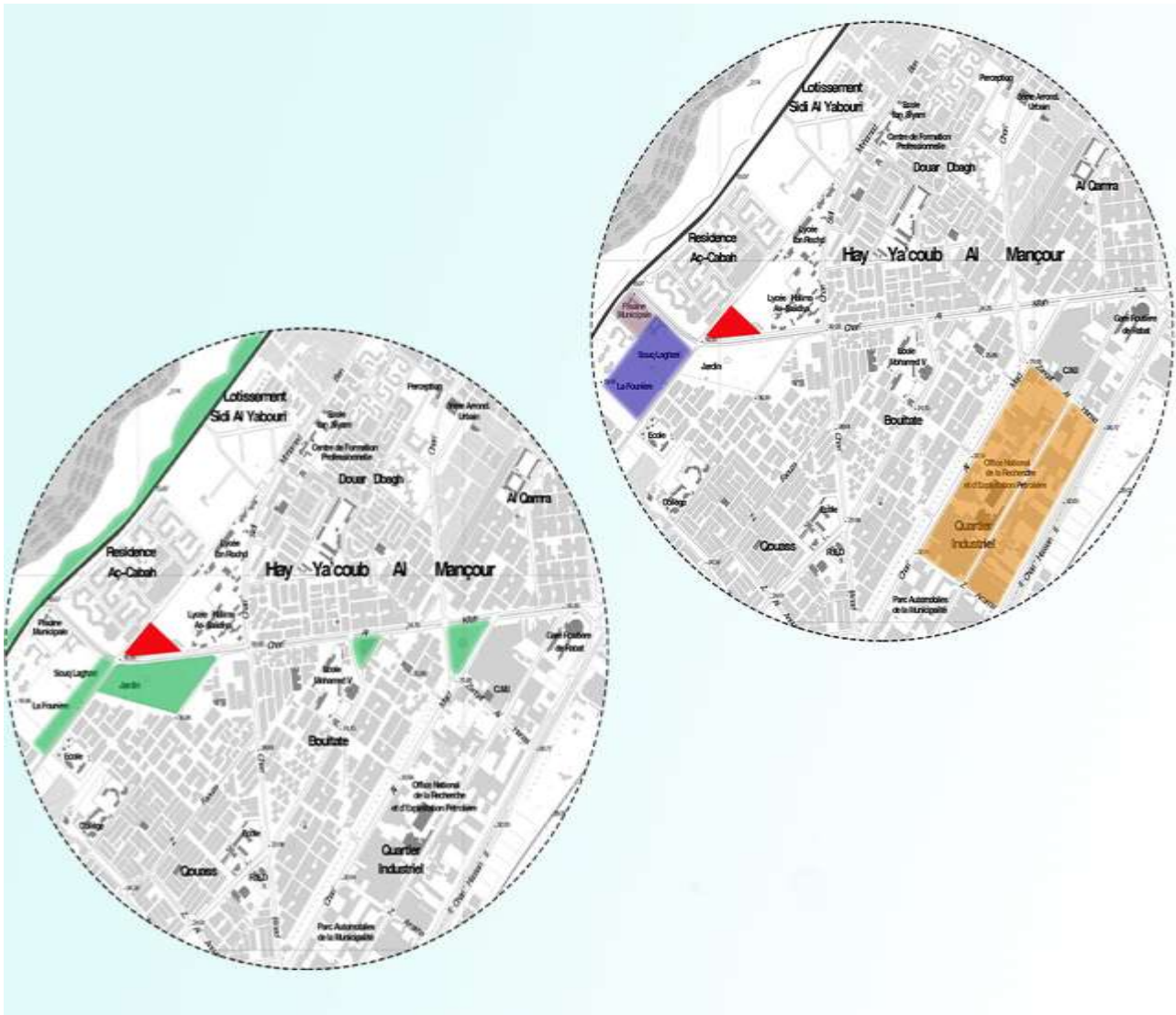
2. Urban planning solution:



A quarter cluster building of open type was formed. All buildings have a height of 5 floors, creating a comfortable environment for walking on a human scale. The perimeter elevation is designed to shield quiet recreational indoor areas and townhouses from excessive noise and wind. Scheme of formation:

1. According to the concept, the complex consists of two residential areas and a connecting volume with a service function in the middle.

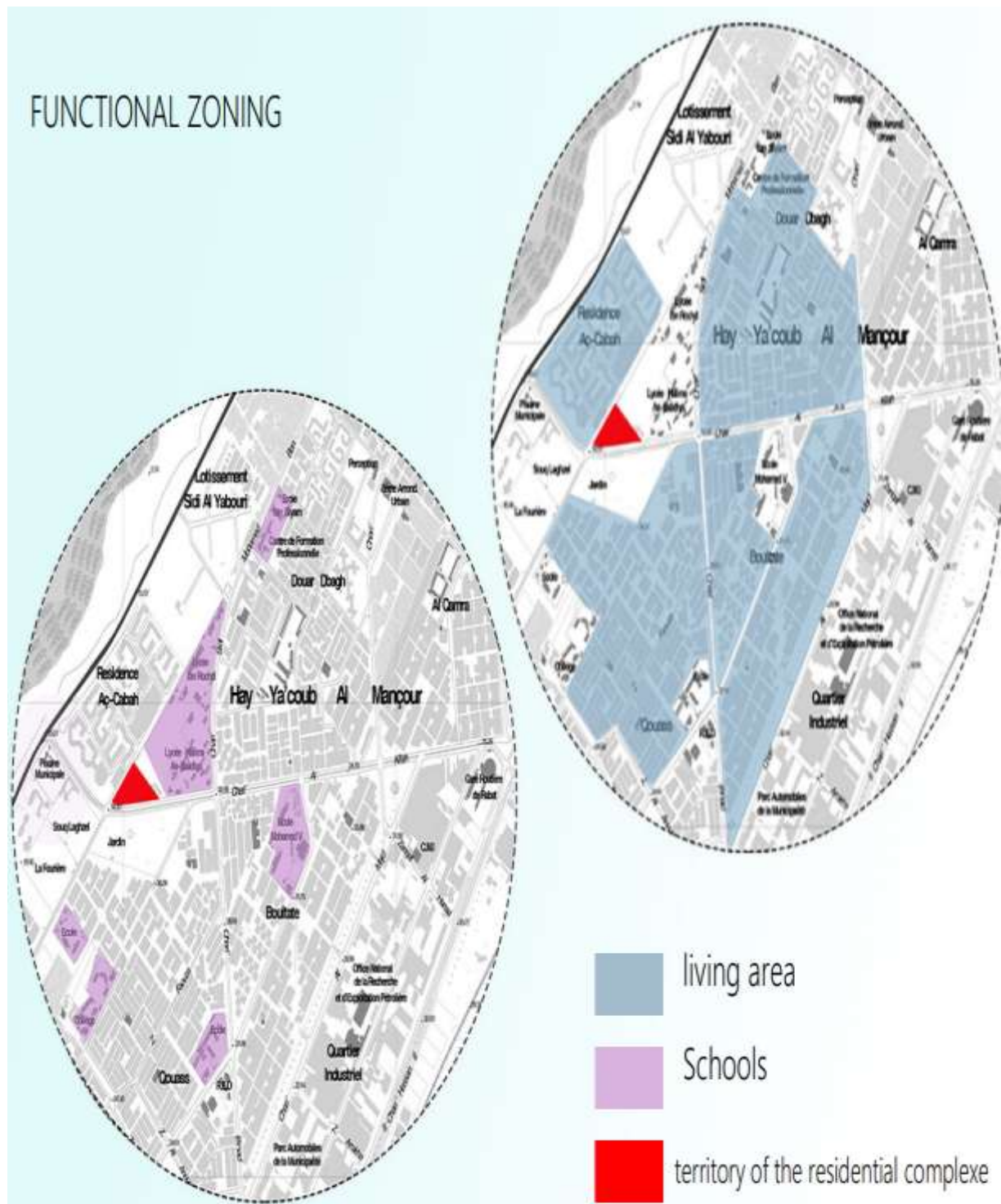
2. The heights of residential buildings correspond to the heights of the surrounding buildings.
3. Increasing the sanitary gap from the neighboring house and industrial zone. Creating additional public space.
4. Organization of pedestrian flows in the courtyard, transition to the park, bicycle and pedestrian network.
5. Organization of facades taking into account insolation.
6. Creation of recreational space and landscaping.



Industrial zone swimming pool

market Green Area Design Area

2.1. Functional zoning of the territory:



2.2. Organization of transport and pedestrian network:

structure pedestrian and car flows inside. Also, in the courtyard and on the street. El-kifah created public spaces for active and quiet recreation and approaches to them. Noise and dust protection have been created with the help of the landscaping system.



2.3. Master plan solution:

☐ Characteristics of the construction site:

The purpose of construction was chosen in the new part of the city where, as part of the rehabilitation program, the area was cleared of low-rise old buildings.

The site is flat and has no visually significant slope. Preliminary construction works have been carried out on the selected territory and the site is ready for construction.



Spatial-spatial solution:

The residential building is designed in the New city in its historical part, the design is given by variators. The design site is a site cleared of windy low-rise buildings. The building has regular triangular shapes and educational double closed volumes. The dwelling house has two identical, mirrored buildings mutually next to each other. Thus, the creation of the image forms a deep shadow zone in the areas of the entrances.

Transport projects and pedestrian passages are organized in the construction district. Designed guest parking and a place for walks and relaxation.

The facade of the building is formed by balconies and canopies that create areas of shadow and light. The roof of the building has a flat structure and is operated. Exit to the terrace is carried out through a separate volume of the superstructure of the sixth floor, which carries out the radius subsoil is carried out through a separate volume of the superstructure of the sixth brought and carried together with the columns support in the meadow.

In general, the construction has the form of a formula, such formo obrazovanie is characteristic of residential buildings.

The concept of the project is based on the idea of creating a cozy, proportionate living, as well as bright and other terraces of the interior. This is achieved on the basis of publicly available, consistent and balanced architectural solutions. The block organization of building constructions is applied, geometrically strict, laconic structures and architectural forms are used, the typical shape of constructions includes the application of decisions in cooperation with natural gamma shades dominating in the landscape environment.

2.4. Technical and economic indicators of Master Plan:

✓ The total area of the plot is 26182 m².

- ✓ Building area-9124m².
- ✓ Building volume-219000m³.
- ✓ Number of inhabitants - 481 people.
- ✓ Number of apartments-97.
- ✓ Number of staff - 60 people.

3- Architectural and planning solution of the building:

3.1. Functional and planning solution:

Planning solutions for apartments have been developed taking into account all regulations and best meet the needs of residents.

The structural scheme is a frameless building. Load-bearing elements -walls. Transverse location of load-bearing walls. Tape foundations are provided. Spatial rigidity is provided by reliable connection of cross walls and walls of stairwells with longitudinal walls, reliable connection of overlapping plates among themselves that is an additional rigid framework.

Foundations: Tape foundations are made of monolithic reinforced concrete, reinforced concrete class C20 / 25 (B25). The bearing layer, the settlement of the foundation, class, diameter and consumption of reinforcement will be determined by calculation and geological conditions.

Overlapping and covering. Beam monolithic. Main beam (500x400mm), secondary (250x200mm). The thickness of the floor slab is 220 mm Stairs, In the building there are two types of stairs: public, and evacuation and fire. Two stairs of public use in the first block in axes H-M 3-4 and 3-G 1-2, and also one ladder of public use in the second block in axes A-B 11-12. Evacuation and fire stairs are made of monolithic reinforced concrete, reinforced concrete class C20 / 25 (B25), with leaning against the walls.

The architectural idea of the formation of a residential building consists of general urban planning concept of the surrogate surter educational natural, climatic and landscape factors, as well as social and economic.

The functional structure (composition and interconnection of premises) of residential buildings is designed in such a way as to typologically meet the real needs of specific groups of the population, their way of life. For this purpose, attention is focused on small family groups and single people of the young and middle generation, as the most active and self-sufficient social groups.

This type of housing with a relatively developed self-service infrastructure is an old commission.

In order to increase the social attractiveness and affordability of housing, the concept of individual housing provides the possibility of a gradual increase in its spatial parameters through the introduction of devices in addition to the original object of other residential or non-residential premises.

3.2 Architectural and compositional solution:

The design scheme, based on the choice of available building materials, they are accepted, which follows from the principles of practicality, reliability, durability of load-bearing and enclosing structures of houses in fairly harsh climatic conditions (wind, precipitation, seismicity), requires the necessary qualities of life, - on the one hand, and also requires cost-effective construction and operation - on the other hand

The project provides for three solutions of residential apartments, each of which has two living spaces - a living room-studio, locked with kitchens, as well as a separate bedroom, the apartments are equipped with a shared bathroom.

In addition to other living quarters, which housed public facilities and indicated the following:

1. Number of floors - 6
2. Dimensions of block sections - 24x24m;
3. Number of apartments in the block section - 24.

At the entrance of the building there is a double vestibule 1.5 m deep. On the ground floors of the block sections of the provided utility rooms for harvesting invention.

The first floor is occupied by administrative premises and social service facilities, the second and all subsequent floors are typical and are formed by two-room apartments.

The residential complex consists of two buildings for small families and singles. In order for the residents of the cells to communicate more with each other, along the corridors of the arranged galleries, and the roofs of the residential buildings are separated by pedestrian crossings. Both buildings consist of a small apartment with an area of up to 48m², which are the most economical typical last year.

The height of the living space is 2.7 m, the project provides pantries and balconies. Functional zoning of apartments is formed: kitchens located in

common rooms, sanitized sanitation and the presence of specialized and additional service facilities.

infrastructure of the residential complex: common meeting room, rooms for staff, pet bath, gym, sauna;

- additional spaces and premises for the comfort of living, such as underground, guest and ground parking, stop of the passenger lift in the garage, management and operation of the residential complex, consortium services, collection and maintenance of apartments.

Design concept of internal spaces:

The building has different dimensions in the longitudinal direction depending on the location, in the transverse - 23m.

On the ground floor there are entrance groups with elevators and stairwells in the residential part, as well as cafes, laundries and bicycle parking in the service area.

str. Shebanate organized entry to the underground parking lot for 130 cars.

The house has one-room, two-room and three-room apartments of different typology (minimum area -48.3 sq. M., Maximum - 135.5 sq. M.), Which are designed to accommodate two or three people.

4- Chapters of related disciplines:

4.1. Architectural structure:

Structural type of the Building - frame-monolithic. Material used -reinforced concrete. The framework - a monolithic reinforced concrete column and a crossbarless reinforced concrete overlapping thickness is 300 mm. Based on this, choosing two types of roofing. Covering on an unused roof - mastic bulk. Self-leveling roof is a mastic of artificial origin. This material consists of binders, additives and fillers. Using the fillers, after cooling the roof coating the output is strong and solid, resistant to significant temperature fluctuations. Very often antiseptic components or herbicides are added to the mixture of liquid coating for roofs. The viscous mastic mass which is poured on a roof surface, after hardening forms a strong monolithic membrane. Self-leveling roofing reliably protects the building from snow, rain, wind, etc. Bulk mastic coating for the roof has almost the same technical properties as the roll material. A significant difference that makes mastic a more popular material is the lack of seams in the bulk coating.

Stairs and platforms in the room are accepted Monolithic reinforced concrete. Floors in Public Buildings are designed depending on the purpose of the Building and the individual ego premises. The project provides the following types of flooring. In wet rooms: bathrooms, kitchen - porcelain. In the premises of General Use - self-leveling floors.

Suspended ceilings made of plasterboard on a metal frame. This allows for hidden wiring of electrical networks and ventilation equipment, as well as improves the sound insulation properties of floors.

The doors are selected depending on the purpose of the room and location. Internal doors of offices, and utility rooms are made of MDF. The door of the central entrance is metal-plastic.

Facade glazing - width of aluminum profiles - 50 mm. The load-bearing structure is located on the inside of the facade and consists of vertical and horizontal tubular profiles, to which the glazing is attached and / or fill the panels with aluminum clamps. Decorative covers are closed on them. This structure can be located both vertically and at a certain angle. The exterior is made of hinged ventilated facades.



Structural type of building - frame-monolithic., Prefabricated reinforced concrete panels., In places monolith. Cross-section of columns - 400 x 400 mm. Step of columns - 6 m and 3 m. Foundations on work and the constructive decision are mixed: under capital walls - tape, monolithic reinforced concrete, thickness is 610 mm; under the columns - monolithic reinforced concrete glass type, depth 1.5 m.

The frame is a monolithic reinforced concrete column and a crossbarless reinforced concrete floor. Partitions between rooms in all functional blocks are provided from a silicate brick 120 mm thick. Exterior walls are made of aerated concrete. Facade glazing - rack and crossbar system. The roof of the building is of two types. A flat operated roof is provided for the arrangement of observation decks and recreation areas. In another part of the building - flat with not used. An internal drain is provided everywhere.

Based on this, two types of roofing are selected. Covering on an unused roof - mastic bulk. Self-leveling roof is a mastic of artificial origin. This material consists of binders, additives and fillers. Thanks to fillers, after cooling the roof covering turns out strong and firm, steady against considerable temperature fluctuations. Very often, manufacturers add antiseptic components or herbicides to the mixture of bulk roofing. Viscous mastic mass, which is poured on the roof surface, after hardening forms a strong monolithic membrane. Self-leveling roofing reliably protects the building from snow, rain, wind, etc. Bulk mastic covering for a roof has practically the same

technical properties, as well as rolled material. A significant difference that makes mastic a more popular material is the lack of seams in the bulk coating.

Stairs and platforms in the room adopted monolithic reinforced concrete.

Floors in public buildings are designed depending on the purpose of the building and its individual premises. The project provides for the following types of flooring. In wet rooms: bathrooms, kitchen - porcelain. In public areas - self-leveling floors.

Suspended ceilings made of plasterboard on a metal frame. This allows for hidden wiring of electrical networks and ventilation equipment, as well as improves the sound insulation properties of floors.

The doors are selected depending on the purpose of the room and location. Interior doors of offices and utility rooms are made of MDF. The door of the central entrance is metal-plastic.

The exterior is made of hinged ventilated facades. Hinged ventilated facades (NVF) are a protective structure consisting of a subsystem (brackets, profiles, fastenings) and facing having an air gap. Designed to reduce energy consumption for heating and maintenance costs, as well as to protect the exterior walls of the building from the effects of precipitation, melt water, wind and sunlight. The system of the ventilated facade from metal plays function of a highly effective lightning rod. Multilayer system NVF consisting of insulation, wind, vapor barrier and metal subsystem improves the indoor microclimate, reduces noise and vibration inside the building, and removes moisture from the walls of the building, thereby protecting against corrosion and extending the life of reinforced concrete steel load-bearing structures. One of the main advantages of vent facades is increase of energy efficiency of construction, ecological cleanliness and decrease in expenses for service (cleaning and repair of a facade).

4.2. Occupational safety:

Analysis of harmful and dangerous factors that are taken into account when designing a public building:

1. General provisions:

The designed object is Residential Complex. The building is located in the kingdom of Morocco, Rabat, Chebanate Avenue.

Main design standards and ways to avoid harmful and dangerous factors are described in the regulations of the Ministry of Health of Ukraine.

The following harmful and dangerous factors are taken into account when designing a public building:

- movement of vehicles and their moving parts; movement of cargoes by load-lifting mechanisms over zones of performance of works;
- violation of the requirements for transportation and storage of explosive substances and materials;
- non-compliance with regulatory requirements for storage of structures, insufficient artificial lighting of storage areas for materials and structures;
- unfavorable meteorological conditions of the production environment;
- location of workplaces in dangerous areas, closed volumes, at a significant height relative to the ground or well below ground level;
- probability of fires and explosions;
- increased voltage in the electrical circuit, the short circuit of which can occur through the human body;
- increased dustiness (gassiness) of the air at the working area;
- location of the workplace at a significant height relative to the earth's surface;
- spontaneous collapse of brickwork elements;
- moving machines, their working bodies, structures and materials moved by them;
- insufficient artificial lighting of the work area during work in the dark;
- location of workplaces near the difference in height up to 1.3 m and more;
- moving machines and objects moving by them;
- collapse of elements of building structures and formwork;
- elevated temperature of the reinforcement bar (during the work on the preliminary thermal stress of the reinforcement bar);
- noise and vibration, insufficient illumination of the workplace; adverse weather conditions;
- collapse of structural elements of buildings and structures;
- falling materials, tools;
- performance of works in the area near overhead power lines;
- lifting loads, the weight of which exceeds the load capacity of the mechanisms;
- insufficient rigidity of the structure, which can lead to its destruction during installation;
- overturning of machines, falling of their parts;

- increased contamination of the skin, overalls with chemicals, aerosol, dust;
- sharp edges, roughness on surfaces of finishing materials and structures;
- hazardous substances;
- flammable substances;
- sharp edges, corners, pins.

2. Technical means and organizational measures provided in the project for elimination of action of harmful and dangerous production factors:

2.1. Transport and loading and unloading works:

The movement of trucks on production territories, construction sites, loading and unloading areas and access roads to them must be regulated by effective road signs and indicators.

Vehicles and equipment used for loading and unloading operations must correspond to the dimensions of the site and the nature of the cargo.

Transport and loading and unloading operations must be performed in a mechanized manner. Compliance with the procedure and method of transportation, loading and unloading of goods and the relevant safety requirements is the supervisor's responsibility.

Loading and unloading platforms must have a slope of not more than 5°, the dimensions and coverage must correspond to the design of works and be placed in the assembly areas of cranes.

During loading and unloading operations, it is necessary to comply with the requirements of regulations on the limits of lifting and moving cargo and admission of employees to perform such work. As an exception, men are allowed to carry loads up to 50 kg on stretchers horizontally and at a distance of not more than 50 m.

In the case of placing trucks on loading and unloading platforms, the distance between trucks standing one behind the other must be not less than 1.0 m, and between cars standing side by side, not less than 1.5 m.

2.2. Electric welding and gas-flame works:

Persons not younger than 18 years of age who have passed a medical examination, special training and testing of theoretical knowledge and practical skills in specific welding methods and certain types of welding work, passed the examination of the attestation commission and have the appropriate certificate are allowed to perform electric welding and gas-flame works.

Electric welders must have an electrical safety group not lower than II.

Workers who have violated electrical or fire safety requirements must pass an extraordinary knowledge test.

Welders who have passed a special medical examination, have experience of climbing work of at least one year, the category of the welder is not lower than III

are allowed to perform electric welding and gas-flame works at a height of 5 m and more.

Welding, cutting and heating with open flames of appliances, vessels and pipelines that contain any liquids or gases under pressure, as well as filled with flammable or harmful substances, or those belonging to electrical devices, is not allowed.

Before sealing, welding (cutting) containers from flammable and combustible liquids, they must be pre-cleaned (washed, steamed, ventilated five or six times by changing the air) to remove traces of these liquids, followed by monitoring the air. Such containers must be filled and refueled during soldering or welding with neutral gases and with open plugs (lids) before sealing and welding.

Simultaneous performance of electric welding and gas-flame works inside closed tanks is not allowed.

It is not allowed to use petrol cutters when performing gas-flame works in tanks, wells and other closed tanks.

It is not allowed to perform welding work outdoors during rain and snow.

2.2.1. Safety requirements at workplaces where electric and gas welding works are performed:

Locations of welding work outside the permanent welding stations must be determined with the written permission of the supervisor or a specialist responsible for fire safety.

Welding places must be provided with fire extinguishers.

Workplaces where electric and gas welding works are performed, passages to them at a height of 1.3 m and more and at a distance of less than 2 m from the difference in height, must be protected by temporary fences. When welding in a carbon dioxide atmosphere, the fences must not reach the floor by 300 mm.

It is forbidden to perform welding work on additional portable ladders.

Places of electric welding and gas-flame works on this, as well as on the lower tiers (if there is no protective refractory flooring or flooring protected by refractory material) must be free from combustible materials within a radius of at least 5 m, and from explosive materials and equipment (gas generators, gas cylinders, etc.) – not less than 10 m.

When cutting structural elements, measures must be taken to prevent accidental collapse of the cut elements.

Workplaces of welders in the room during open arc welding must be separated from adjacent workplaces and passages by non-combustible and light-proof screens (screens, shields) with a height of not less than 1.8 m.

When welding outdoors, fences must be placed in the case of simultaneous operation of several welders near each other and in areas of heavy traffic.

If welding work is performed using liquefied gases (propane, butane) and carbon dioxide, the welders' workplaces must be equipped with local suction from below.

Welding places must be equipped with exhaust ventilation. Welding is not permitted if the local exhaust ventilation does not work.

Work in closed or confined tanks must be performed by a welder under a permit under the supervision of a supervisor with electrical safety qualification group II and

above, who must be outside. The welder must use a seat belt with a safety rope, the end of which is with the supervisor.

2.3. Masonry works:

Erection of the walls (brickwork) of each upper floor of a multi-storey building must be carried out after the installation of floor structures, platforms and marches in the stairwells.

If it is necessary to erect brick walls without laying floors or coverings, it is necessary to use temporary fastenings of these walls.

When erecting walls higher than 7 m, it is necessary to use protective canopies or mesh fencing around the perimeter of buildings, which must meet the following requirements:

- the width of protective canopies or mesh fences must be at least 1.5 m with a slope to the wall so that the angle formed between the lower part of the building wall and the surface of the canopy was 110° , and the gap between the building wall and the plane of the canopy did not exceed 50 mm;

- protective canopies and mesh fences must withstand the snow load specified for this climatic region, and a concentrated load of at least 1600 N (160 kgf), applied in the middle of the run;

- the first row of protective canopies must be installed at a height of up to 6 m from the ground, have a solid deck and be stored until the end of the construction of the walls to full height.

The second row of protective canopies must be installed at a height of 6 – 7 m above the first row and in the process of further construction of the wall it must be rearranged every 6 – 7 m and have a solid or mesh floor with a hole size (cells) not more than 50 x 50) mm.

Workers working on the installation, cleaning or removal of canopies must wear seat belts. Walking on canopies, using them as scaffolding, as well as stacking materials on them is prohibited.

Construction of walls up to 7 m high is allowed to be performed without the installation of protective canopies with the definition of a dangerous zone around the perimeter of the building.

2.3.1. Performing of masonry works:

Erection of walls must be performed from the floor slabs or scaffolding. The design of scaffolding must meet the allowable load in accordance with the specified in the work execution program and schedule.

It is forbidden to make brick masonry from accidental scaffolding.

The height of each working tier of masonry is determined in such a way that the level of masonry after each bridging of the paving means was not less than two rows of masonry above the level of the new working flooring.

Erection of walls below and at the level of the floor, which is arranged from prefabricated reinforced concrete slabs, must be performed from the scaffolding installed on the lower floor.

It is forbidden to mount floor slabs without a pre-lined brick board two rows above the stacking slabs.

Stitching of external seams of bricklaying should be carried out from overlapping or scaffoldings after laying of each row of a laying. It is forbidden to perform this operation from a freshly laid wall.

When erecting the walls of buildings to a height of up to 0.7 m from the working deck, as well as during work at height, it is necessary to use the means of collective protection (fencing, catching devices) or safety belts specified in the work execution program and schedule.

During thunderstorms, snowfall, fog, which significantly impair visibility within the work front, or at wind speeds of 15 mps and more, it is prohibited to perform brick masonry of the outer walls of multi-storey buildings and structures.

For transportation by cranes of artificial materials – bricks, ceramic stones, small blocks – it is necessary to use inventory pallets, containers, load-grabbing devices which prevent falling of these elements during lifting, unpacking, selection for work.

Above the place of loading of the lift the protective double flooring from boards not less than 40 mm thick has to be established at height of 2.5 m – 5 m.

Arrangement of fastenings of eaves, formwork of brick lintels, arched structures must be performed in accordance with the technological documentation. Remove temporary fasteners, formwork of brick lintels and arched structures is allowed if the solution has reached the strength determined by the process map.

Erection of stone structures by freezing is allowed if the work execution program and schedule has instructions on the possibility, procedure and conditions of application of this method. Thus on solutions without chemical additives it is allowed to erect constructions no more than 4 floors and no more than 15 m high.

Structures that are in the process of natural thawing and hardening must be constantly monitored.

Preparation and processing of natural stones within the construction site must be performed in specially designated areas, where the stay of persons who do not perform this work is prohibited. Workplaces at a distance of less than 3 m from each other must be separated by protective screens, and workers must be provided with personal protective equipment.

It is necessary to process stones in gloves and glasses with unbreakable glass.

2.4. Concrete works:

Cement for concrete work must be stored in silos, hoppers, crates and other closed containers, preventing spraying during loading and unloading. The loading openings must be closed with protective grilles and the grilles must be locked.

When concreting floors, the formwork must be fenced along the entire perimeter. All openings in the working floor of the formwork must be covered with shields. If it is necessary for the openings to be permanently open, they must be closed by a lattice.

Locations of supports of floor formwork risers must be fenced and marked with prohibitory safety signs with explanatory inscriptions. Entrance (passage) during concrete works in (through) this zone is forbidden.

Before installation of prefabricated formwork of walls, columns, pylons located on the edge of the floor, crossbars, vaults in cases where the installer during the work is not on the working floor of the formwork, must be arranged working decks at least 0.8 m wide with protective solid fences, the design of which must be designed for possible technological loads and be defined in the work execution program and schedule.

After removing part of the sliding formwork and suspended scaffolding, the end sides of the formwork must be fenced.

To protect workers performing work on suspended scaffolding from objects that may fall from above, the outer perimeter of the sliding formwork must be equipped with visors not less than the width of the scaffolding.

A protective fence at least 1.8 m high must be installed at the reinforcement bar tension sections in places where people can pass.

Reinforcement bar tensioners must be equipped with an alarm that is activated when the tensioner actuator is switched on.

It is forbidden for people to be closer than 1.0 m from electrically heated reinforcing bars.

Procurement and assembly of enlarged reinforcement frames must be performed in specially designated places.

Protective gloves and goggles must be worn when using concrete mixes with chemical additives.

The overpass for feeding the concrete mixture by dump trucks must be equipped with bumpers. Passages not less than 0.6 m wide should be provided between jack beams and fences. Transverse jack beams should be installed on dead-end overpasses.

When freeing the bodies of dump trucks from the remains of the concrete mixture, workers are prohibited from being in / on the body of the vehicle.

Before starting concrete work, the manager must:

- check the stability, strength, serviceability of scaffolding, formwork structures, fences of working horizons;
- check the serviceability of containers, hoppers, concrete pumps, manipulators;
- provide employees with the necessary personal protective equipment.

During the operation of mixing machines, the cleaning of the pits for loading buckets should be carried out after secure fixing of the bucket in the raised position.

2.5. Site erection works:

Other work and the presence of unauthorized persons are not allowed in the working area of site erection works.

Installation of structures of buildings (structures) must begin with a spatially stable part: the connecting element, the core of rigidity, and so on.

Installation of structures of each upper floor (tier) of a multi-storey building must be performed after fixing all installed mounting elements in accordance with the project

and achieving concrete (mortar) joints of load-bearing structures of the required strength.

Painting and anticorrosive protection of constructions and the equipment in cases when it is carried out on a building site, it is necessary to do before raising of designs on a design mark. After lifting these structures, painting or corrosion protection may be performed only at the joints and joints of structures.

Unpacking and canning of the equipment to be installed must be performed in the area designated in accordance with the work execution program and schedule and carried out on special racks or gaskets with a height of at least 100 mm.

Tools and materials with explosion-hazardous properties are not allowed during reactivation of the equipment.

During the installation of frame houses, the next tier of the frame may be installed only after the installation of enclosing structures or temporary fences on the previous tier.

Installation of stairways and platforms of buildings (structures), as well as freight and passenger lifts (elevators) must be carried out simultaneously with the installation of structures of the house. Fences must be installed immediately on mounted stairways.

When assembling structures of buildings or structures, installers must be on previously installed and securely fastened structures or means of paving.

It is forbidden for people to be on the elements of structures and equipment during their lifting and moving.

Hinged mounting platforms, ladders and other devices required to perform work at height must be installed on structures that are mounted before their lifting.

For transition of installers from one design to another it is necessary to apply ladders, transition bridges and ladders having protections.

People are not allowed to be under the elements of mounted structures and equipment.

Hinged metal ladders longer than 5 m must be enclosed with metal arches with vertical connections and securely attached to structures or equipment.

Lifting of workers on hinged ladders to height more than 10 m is allowed only in case of their equipment with platforms for rest not less than in each 10 m on height.

Stretchers for temporary fixing of the mounted designs need to be attached to reliable support. The number of dislocations, their material and cross section, methods of tension and fastening points are determined in the work execution program and schedule.

Stretch marks must be located outside the dimensions of traffic and construction machinery; they must not touch the sharp corners of other structures. Bending of extensions in places of their contact with other structures is allowed only after checking the strength and stability of these elements under the influence of forces from disengagement.

It is necessary to prevent the rocking and rotation of the elements of structures or equipment to be mounted during movement.

Slinging of structures and equipment must be performed by means that provide the possibility of remote slinging from the working horizon in the case when the height to the lock of the load-carrying means exceeds 2 m.

2.5.1. The order of site erection works performance:

Prior to the installation work, it is necessary to determine the order of exchange of conditional signals between the person who manages the installation and the driver (motorist) of the crane. All signals are given by only one person (foreman of the assembly team, section leader, rigger-slinger). Only a worker who has noticed the danger can give a "Stop" signal.

If the structure to be mounted is out of sight of the crane operator, a reliable connection must be ensured between him and the installers. If this is not possible, intermediate signaling devices from among the slingers (riggers) are assigned.

In particularly important cases (in the case of lifting structures using complex rigging, the method of rotation, when pushing large and heavy structures; when lifting them by two mechanisms or more, etc.) signals should be given only by the supervisor.

Slinging of the mounted elements must be performed in the places indicated in the working drawings, and ensure their lifting and feeding to the installation site in a position close to the design.

It is forbidden to lift the elements of building structures that do not have mounting hinges or holes, markings and markings that ensure their proper slinging and installation.

During installation from vehicles, structural elements must not be carried over the driver's cab.

Cleaning of structural elements to be installed from dirt and ice must be done before lifting.

Elements to be mounted must be lifted smoothly, without jerks, swings and rotations. Lifting loads (frozen, partially covered with soil, debris, connected to elements of other structures, etc.) that exceed the capacity of the assembly crane is prohibited.

It is necessary to lift constructions in two stages: at first on height of 20 – 30 cm, then, after check of reliability of slinging and assembly loops, to carry out the further lifting.

When moving structures or equipment, the distance from them to the parts of the mounted equipment, protruding structures must be horizontally not less than 1.0 m, and vertically - not less than 0.5 m.

It is forbidden to leave the raised elements of constructions and the equipment in the lifted condition during a break in work.

Elements of structures or equipment installed in the design position must be fixed so as to ensure their stability and geometric invariance.

Slinging of structural elements and equipment, which are installed in the design position, must be done after their permanent or temporary fixing in accordance with the project. It is not allowed to move the installed elements of structures or equipment after their unbundling without the use of installation equipment provided by the work execution program and schedule.

Until the end of verification and reliable fixing of the installed elements, it is not allowed to lean on them the structures located above, unless it is provided by work execution program and schedule.

It is forbidden to sling a load that is in a precarious position, as well as to move the device on a raised load.

When pushing (moving) structures and equipment with winches, the load capacity of brake winches and hoists should be equal to the load capacity of traction means, unless otherwise specified by the project.

It is forbidden to perform installation work at height in open places at wind speeds of 15 mps and more, during ice, thunderstorms, fog, which makes it impossible to see within the work front.

When assembling horizontal cylindrical tanks consisting of individual tsars, it is necessary to use wedge gaskets and other devices that prevent involuntary rolling of tsars.

The aggregation assembly of those to be installed, structures and equipment must be performed in specially designated areas.

2.6. Finishing works, arrangement of heat-insulating facade systems:

Mixtures and mastics during finishing works should be prepared, as a rule, centrally. Preparation of them, as well as the mortar mixture on the construction site must be carried out in rooms equipped with supply and exhaust ventilation to prevent exceeding the maximum permissible concentrations of harmful substances in the air of the working area.

Contractors must be provided with harmless detergents and warm water.

It is not allowed to use paints and solvents of unknown composition, as well as substances and materials that do not have indicators of fire and toxic hazards.

It is not allowed to use paints and solvents of unknown composition, as well as substances and materials that do not have indicators of fire and toxic hazards.

Operation of mobile painting stations for preparation of paint mixes which are not equipped with forced ventilation is not allowed.

Workplaces for finishing works, arrangement of facade systems at height must be equipped with means of paving and stairs-ladders for lifting on them.

The means of paving used during plastering, painting works, arrangement of facade systems in places under which other works are carried out or there is a passage, should be with floorings without backlashes.

Internal plastering works, and also installation of prefabricated eaves and modeled elements of internal rooms need to be carried out only from the platforms or mobile little tables established on a floor, or on continuous floorings. External plaster work must be performed from inventory vertical or suspended scaffolding.

When performing work on the internal stairwells, it is necessary to use special platforms (tables) with different lengths of support struts, which are installed on the steps. The working flooring must be horizontal and have parapet fences.

When working with harmful and flammable explosive materials that form explosive vapors, the room must be constantly ventilated, as well as for 1 hour after work, using natural or mechanical ventilation.

Places over which glass or facing works are performed must be fenced.

Glazing or facing works on several tiers on one vertical at the same time is forbidden.

It is forbidden to heat and dry the premises with roasters and other devices that emit fuel combustion products into the premises.

When working with solutions containing chemical additives, it is necessary to use personal protective equipment (rubber gloves, protective ointments, goggles) in accordance with the manufacturer's instructions, taking into account the composition of the substances used.

Respirators with safety goggles should be worn during dry cleaning of surfaces and other work related to the release of dust and gases, as well as during mechanized spackling and painting.

Wear safety goggles, rubber gloves and an acid-resistant apron with a bib when cleaning surfaces with acid or caustic soda.

Goggles must be worn when applying the mortar to a ceiling or vertical surface.

2.6.1. The order of works performance:

Before the start of each shift, the serviceability of mortar pumps, hoses, dispensers and other equipment used during plastering must be checked. Manometers must be tested and sealed (pass state inspection). If the pressure on the manometers of the mortar pumps exceeds the permissible values specified in the passport, it is not allowed to work on the mortar pump.

It is not allowed to bend hoses at an acute angle and in the form of a loop, and also to tighten epiploons during work of plaster cars.

Workplaces of plaster station operators (nozzles) must be provided with two-way alarm (sound, light, radio, etc.) with workplaces of mortar pump drivers.

Operators who apply plaster to the surface with a nozzle and workers who spray the solution by hand must be provided with safety goggles.

When performing work on the preparation and application of paint mixtures, including imported, it is necessary to follow the requirements of the instructions of manufacturers on occupational safety.

All incoming components and ready-made paint mixtures must have hygienic certificates indicating fire and explosion hazards, terms and conditions of storage, the presence of harmful substances, recommendations on the method of application, the need for collective and individual protection.

It is not allowed to use solvents based on benzene, chlorinated hydrocarbons, methanol.

When performing painting works with the use of pneumatic units it is necessary:

- before the start of work to check up serviceability of the equipment by the pressure specified in the passport, the alarm system, existence of protective grounding;
- during performance of works not to allow bending of hoses and their contact to the moving steel ropes;
- switch off the air supply and close the air valve during a break in operation or in case of malfunctions of the unit mechanism.

Frozen hoses must be heated in a warm room. Do not heat the hoses with open flame or steam.

Containers with explosive materials (varnishes, enamels, nitro paints, etc.) during the break should be closed with corks or lids, and open with a tool that does not cause sparks. Paints and varnishes must be stored at workplaces in tightly closed containers, in quantities not exceeding the variable demand, or in quantities not exceeding the capacity of the paint tank or standard flask (40 l). Each container with paint, solvent must have a sticker or label with the exact name of the material and an indication of flammable properties.

Empty containers made of paints and varnishes must be tightly closed and stored in specially designated places.

When painting in rooms with the use of pneumatic devices, as well as quick-drying paints and varnishes containing harmful volatile solvents, workers must be provided by the employer with respirators of the appropriate type and goggles. Such work must be performed with open windows or artificial ventilation. However, the amount of gases, vapors and dust in the work area should not exceed the maximum permissible concentration of harmful substances.

For fans it is necessary to use electric motors in explosion-proof execution, and to take out switches in a safe place.

Fire works (welding, etc.) must be carried out at a distance of not less than 15 m from the open openings of the premises in which the work is performed using paints and varnishes containing volatile organic solvents.

Paint sprays and hoses at the end of the work shift must be cleaned and rinsed of paint residues.

At the workplace where the spray paint which is under a high pressure of a paint and varnish material is used, there should be warning inscriptions

"Flammable", "High pressure!". The strainers of airless spraying systems must be removed and washed at least once a week.

When painting by airless spraying, it is forbidden to use electric heating systems until the hydraulic system is completely filled.

During dry cleaning indoors, workplaces must be equipped with local dust extractors.

When mechanizing sawing of finishing blocks and plates it is necessary to use means of dust suppression - for example, water.

The spraying machine must be equipped with a wooden deck with a stream for water drainage. The flooring must be cleaned daily.

Lifting and transferring the glass to the place of its installation must be performed in a mechanized manner in a special container.

The lifting area must be fenced.

Cutting of glass must be carried out in separate heated rooms in a horizontal position on special tables.

Glazing works areas must be fenced and protected from falling glass with canopies or solid flooring.

2.7. Electrical works

Laying cables and wires is allowed only in fully fixed pipes, trays, boxes, etc.

Welding work on the transformer housing is allowed only after filling it with oil to the level of 200 – 250 mm above the welding site.

Before drying electric machines and transformers with electric current, their housings must be grounded. When drying transformers in your own or special metal tank by induction method, it is necessary to avoid contact with the windings.

It is not allowed to perform work or be at a distance of less than 50 m from the test site of air switches. The safety valve on the air collector must be adjusted and tested for a pressure exceeding the working pressure by more than 10%.

Fuses in the electrical circuits of voltage transformers and power transformers on which the adjustment work is performed must be removed. At the place where the fuses are removed, you need to hang a poster: "Do not turn on. People are working."

2.7.1. The order of works performance:

If it is necessary to supply operating current for the adjustment of mounted circuits and electrical installations, it is necessary to hang warning posters (signs) on them. Non-debugging work must be stopped and workers engaged in this work must be removed from the work area.

Prior to commissioning of switchgear, all supply lines and those to other substations must be disconnected from the equipment and grounded.

The connection of the mounted electrical networks and electrical equipment to the existing electrical networks must be carried out by the operation service of these networks.

It is not allowed to use and connect as temporary electrical networks and electrical installations that have not been put into operation in a certain order, as well as to perform electrical installation work on the assembled and commissioned electrical installations without the permission of the commissioning organization.

During commissioning work on the installed electrical installation, the operating voltage on it can be applied by the operating personnel only after the introduction of the operating mode on the electrical installation and in the presence of a written request of the head of commissioning work.

Lifting, moving and installing disconnectors and other circuit breakers are performed in the "On" position, and devices equipped with return springs or free distribution mechanisms – in the "Off" position.

When adjusting the switches connected to the drives, care must be taken to prevent them from being switched on or off unintentionally or unintentionally.

Fuses of the control networks of the installed device must be removed for the entire time of installation.

Before the beginning of test works it is necessary on switching devices:

- bring the spring drives of switching devices to the inoperative position;
- switch off the operating circuits, alarm circuits, drive power circuits and heating circuits;

- close and lock the latches on the air supply pipes in the tank tanks and pneumatic actuators, as well as release the air available in them;
- hang posters on the keys and buttons of the remote control "Do not turn on. People are working".

Simultaneous operation on drives and switching devices is not allowed.

When working on power transformers, the terminals of the primary and secondary windings must be shorted and grounded for the entire duration of electrical work.

All terminals of voltage transformers and current transformers must be shorted and grounded during installation.

It is necessary to measure the voltage and density of the electrolyte in rubber gloves, respirators, standing on an insulating rubber carpet.

It is necessary to check up a condition of pole clamps of accumulators in dielectric gloves. When tightening the bolts connecting the batteries to each other, it must be impossible to accidentally touch the key to the battery plates of different polarity.

Tightening wires through long boxes, boxes, pipes, blocks in which live wires are laid, as well as laying wires and cables in pipes, trays and boxes that are not fixed in accordance with the project, is not allowed.

Checking the insulation resistance of wires and cables with a megohmmeter must be performed by a link consisting of at least two people, one of whom has group IV, and the other group III on electrical safety. The ends of wires and cables that may be live during the test must be insulated and (or) fenced.

Testing of electric drives is allowed after communication between the personnel located in the room of the board or the control panel, and near electric drives.

During the adjustment of line and limit switches, sensors and other means of automation, the voltage of the power supply networks must be removed.

2.8. Installation of engineering equipment of buildings and structures:

The elimination of deficiencies identified during the testing of the installed system and equipment must be performed on the basis of measures developed and approved by the customer and the general contractor together with subcontractors for the safety of these works.

Installation and removal of jumpers (connections) between installed and operating equipment, as well as connection of temporary installations to existing systems (electrical, steam, technical, etc.) without the written permission of the general contractor and the customer is not allowed.

2.8.1. Organization of workplaces:

Installation of pipelines and air ducts on overpasses must be performed from the inventory scaffolding, equipped with stairs for raising and lowering workers. Lifting and lowering of overpass structures is not allowed.

It is forbidden for people to be under the installed equipment, assembly units of equipment and pipelines until their final fixing.

It is necessary to lower pipes in the fixed trench so that not to break fastenings of a trench.

It is not allowed to roll the pipes into the trench with the help of crowbars and scales, as well as to use the struts securing the trenches as supports for the pipes.

Electrical installations in these premises must be fire and explosion-proof.

Premises in which degreasing is carried out must be equipped with supply and exhaust ventilation. When working outdoors, workers must be on the windward side.

Workers engaged in degreasing pipelines must be provided with appropriate gas masks, overalls, gloves and rubber gloves in accordance with the rules of free issuance of special clothing, special footwear and other personal protective equipment to workers.

2.8.2. The order of works performance:

Installation of equipment, pipelines and air ducts near electrical networks (within a distance equal to the maximum length of the unit or link of the pipeline to be mounted) is performed when the voltage is removed.

During purging of pipes with compressed air it is forbidden to be in chambers and wells where latches, valves, cranes, etc. are established.

When blowing pipes, shields must be installed at the ends of the pipes to protect the eyes from scale and sand.

Personnel are not allowed to stand against or near the ends of the blown pipes.

When installing pipelines and equipment, joining and connecting holes and checking their coincidence in the parts to be mounted must be performed with a special tool (conical mandrels, assembly plugs, etc.). It is not allowed to check the coincidence of holes in the mounted parts with your fingers.

Measures must be taken during the installation of the equipment to prevent its unauthorized or accidental switching on.

When installing equipment using jacks, measures must be taken to prevent skewing or tipping of the jacks.

2.9. Testing of engineering equipment of buildings and structures:

Testing of equipment and pipelines must be performed under the direct supervision of a specially appointed person from among the specialists of the installation organization.

Before testing the equipment it is necessary:

- to acquaint the head of works with the personnel participating in tests, with the order of carrying out of works and measures of their safe performance;
- to warn workers on adjacent sites about the time of testing;
- to provide visual, and if necessary, by means of devices, check of fastening of the equipment, a condition of isolation and grounding of an electric part, presence and serviceability of fittings, starting and braking devices, control and measuring devices and plugs;
- fence and mark the test area with appropriate signs;
- if necessary, arrange an alarm system;
- ensure the possibility of emergency shutdown of the equipment under test;

- check the absence of foreign objects inside and outside the equipment;
- mark with temporary signs temporary plugs, hatches and flange connections;
- equip posts at the rate of one post within the visibility of another, but at least every 200 m from each other to warn of the danger zone;
- determine the places and conditions of safe stay of persons engaged in testing;
- to ensure the readiness of fire extinguishers and maintenance personnel who may be involved in the fire;
- to provide illumination of workplaces not less than 50 lux;
- appoint persons responsible for carrying out the safety measures provided for in the test program.

Elimination of defects on the equipment detected during the tests must be performed after its shutdown and complete shutdown.

Simultaneous hydraulic tests of several pipelines mounted on the same supporting structures or trestle are allowed if the supporting structures or trestle are designed for the appropriate loads.

If the pipelines are located near residential or operating public or industrial buildings, their pneumatic tests can be carried out provided that the window and door openings of these buildings, which are located within the danger zone, must be closed by protective fences (shields, bars).

2.9.1. The order of works performance:

Inspection of the equipment after the tests is allowed to do after reducing the test pressure to the worker.

Protective fences (screens) must be installed in front of open hatches and fittings when testing equipment and piping after testing.

Tests of equipment and pipelines under load must be performed after tests of its idleness.

Testing of equipment is allowed only after timely warning of persons in the test area and obtaining the permission of the test manager.

During equipment tests it is not allowed:

- remove protective fences;
- open hatches, fences, clean and lubricate equipment, touch its moving parts;
- check and eliminate defects in electrical circuits of electrical equipment and automation devices.

Before pneumatically testing the piping, the safety valves must be adjusted to the appropriate pressure.

Plastering of welds directly during tests of pipelines and equipment is not allowed.

The connection and disconnection of the air supply lines from the compressor to the test line is only permitted after the air supply has been stopped and the atmospheric pressure has been reduced.

3- Measures provided in the project to ensure the safety of visitors and staff during the operation of the building

3. 1. General duties of employers:

- Employers should ensure that buildings, work locations, facilities and equipment are always managed and they should organize the work in such a way that the workers are protected as far as possible against any risk of accident or damage to health.
- When purchasing machinery, equipment, vehicles or any other equipment, employers should ensure that they are that these comply with official safety requirements applicable or, in the absence of such requirements, that they are designed or protected so that they can be used safely.
- Employers should provide the necessary oversight to ensure that workers perform their work in best possible conditions of safety and hygiene.
- A competent person should in particular supervise work carried out by more than one person, where understanding and cooperation are necessary for security.
- Employers should assign workers to jobs suited to their age, gender and physical abilities, their state of health and their qualifications.
- Employers should not affect workers with physical or mental disabilities (deafness, poor eyesight, disposition to dizziness, epilepsy) to jobs where they could endanger their safety or that of others.
- Employers should ensure that all workers are adequately informed about the risks inherent in tasks assigned to them and the precautions to be taken prevent accidents and damage to their health; they should more especially ensure that young workers, workers newly hired illiterate workers as well as foreign workers are well educated about these risks and precautions and are subject to appropriate supervision.
- Employers should provide workers with: copies, extracts or summaries of national regulations or Safety and hygiene in construction and public works premises and, where applicable, instructions or instructions relating to protection against accidents and damage to health; they will also be able to display these provisions clearly to suitable places.
- To the extent possible, regulations, instructions and guidelines should be written in the language or languages of workers.
- Text displayed should be proof or sheltered causes of deterioration, bad weather, etc.

- If possible, special safety rules should be established for each kind of work that needs to be accomplished on a construction site.
- Through a competent person, employers should conduct periodic safety inspections, at appropriate intervals, of all buildings and work locations, all equipment and work in progress.
- Employers should prohibit the use of buildings, access to workplaces or the use of equipment where dangerous defects have been observed for so long that it has not been remedied.
- If safety demands it, employers should put developed a control system to ensure that all members of a work team, including drivers mobile vehicles, have returned to their barracks or their accommodation after the end of work.

3.2. General duties of architects and engineers and design offices:

- When the construction of a building or a work of civil engineering is being studied, the project managers should consider the safety of the workers who will be employed in the execution Works.
- The authors of the project - architects, engineers, etc. - should endeavor to include nothing that would require procedures for construction unduly dangerous and would entail excessive risks if they can avoid it by modifying the project.
- The authors of the project should study the problems safety related to subsequent maintenance of the building or structure in the event that it would entail particular risks.
- The project should make it possible to carry out these maintenance works with the minimum of risk.

3.3. General duties of workers :

- Within the limits of their responsibilities, workers should do everything in their power to preserve their health and safety, as well as that of their fellow workers.
- Before starting their work, the workers should examine workplaces and the equipment they will use and report immediately to the team leader or

other competent superior any dangerous defect that they would have noticed.

- Workers should make good use of all protective or safety devices and all other means intended to ensure their protection or that of others.
- Except in an emergency or if they have been duly authorized to do so, workers should never remove, modify, move or touch safety devices or other devices intended to ensure their protection or that of others; they shouldn't no longer hinder the application of the methods or procedures adopted to prevent accidents and damage to health
- Workers should not touch equipment - machines, devices, etc. - that they do not have the authorization to use or that they are not responsible for maintaining.
- Workers should not sleep or rest in dangerous places - for example on scaffolding, on railways, in garages - or near a fire, dangerous or toxic substances, running machinery, moving vehicles or heavy equipment.
- Workers should familiarize themselves with all safety and health instructions relating to their work and comply with it.
- Workers should refrain from any practice or of any negligent or reckless act that could endanger their health or safety or that of others.
- Workers should wear protective clothing and protective equipment suitable for their task and conditions atmospheric.
- Workers should ensure good order and cleanliness.

3.4. Duties of manufacturers and sellers:

- So that no hazardous material reaches the users and that they can take the necessary precautions, manufacturers and sellers should ensure:
 - a) that equipment intended for use in building and public works - machinery, apparatus, vehicles, etc. - complies with legal or regulatory provisions and applicable official, national or other safety standards its design and construction;
 - b) that the material which is not covered by legal provisions or regulatory or official, national or other standards, is designed and constructed to be as safe as possible;

c) that the material is accompanied by printed instructions containing the instructions necessary for it to be properly tested, used and maintained, and drawing attention to possible dangers.

- Manufacturers and sellers of flammable liquids, explosives, toxic or corrosive products or other substances.
- Dangerous Goods should provide users with appropriate instructions so that these products can be used safely.

3.5. Workplaces and equipment:

- Means of access and exit
- As far as possible, means of access and Suitable and safe egress should be provided at all work locations.
- Means of access and egress should be maintained in a condition that meets safety requirements.
- When safe means of entry and exit have been specially fitted out, workers should always borrow to get to or from their workstation.
- Heating, lighting, ventilation Heater
- Where possible, work locations should be suitably heated, if necessary; if it is impossible, arrangements should be made to allow workers to warm up from time to time in a place appropriate during their work.
- All useful steps should be taken to prevent vapors, fumes, etc. from interfering with the visibility over work areas or around equipment, there where workers are working.
- Where natural lighting is not sufficient to ensure safety, appropriate artificial lighting should be provided on work sites and in access routes.
- Artificial lighting should not cause any danger; it should not cause glare or shadows annoying.
- Where applicable, lamps should be fitted with suitable guards.

Ventilation:

- In closed workplaces, appropriate arrangements should be taken to ensure sufficient air exchange.
- When the atmosphere is dangerously contaminated by dust (during grinding, cleaning, spraying, etc., or when handling materials or of various

objects), by harmful gases or by other agents, measures should be taken to remove contaminants or reduce their concentration to a level which does not present no danger, thanks to efficient ventilation; special attention should be paid to the ventilation of crane cabins or truck or other similar enclosed workstations.

While it is not technically possible to eliminate the dust, fumes or harmful gases so as to prevent any risk to health, workers should be equipped with breathing apparatus.

Order and cleanliness:

- Unused materials and equipment should not be not be placed or left in places where they dangerously obstruct work areas or passageways.
- Any protruding nails should be removed or folded up to avoid injury.

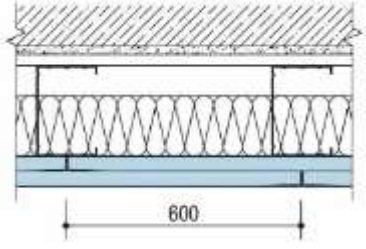


We should not leave equipment, tools lying around or objects where they

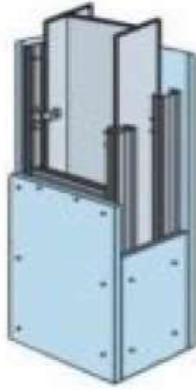
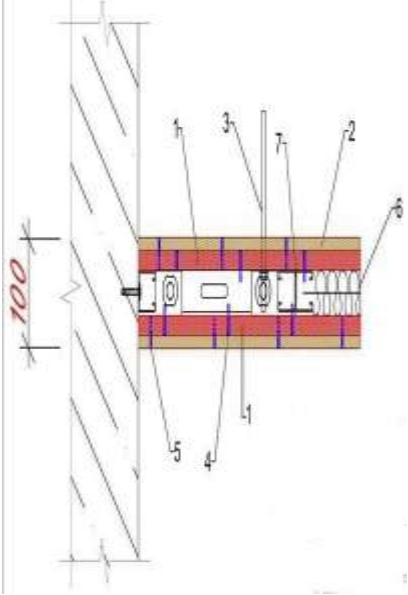
- Rubble should not be allowed to accumulate on construction sites.
- Workplaces and passageways made slippery by frost, snow, oil, etc., should be cleaned or made practicable by the spreading of sand, sawdust, ash or other suitable material.
- Portable equipment should be returned to its place after use.

Fire protection: Fire fighting equipment:

- If safety demands it, workplaces should be, provided, as far as possible:
 - (a) appropriate and sufficient means of fire fighting;
 - b) a sufficient water supply in terms of flow rate and pressure.
- All supervisors and a sufficient number of workers should be trained in the use of wrestling equipment against fire.
- We should be able to appeal, during all periods of work, to a certain number of people trained in the use of fire-fighting equipment and able to intervene without delay.
- Fire-fighting equipment should be carefully maintained and checked periodically by a person qualified.
- Access to fire-fighting means (hydrants fire, water intakes, portable fire extinguishers, etc.) should always be kept clear.

- Fire-fighting equipment should be placed in full view.
- Appropriate fire extinguishers should be placed in desired number:
 - a) in all buildings where combustible materials are stored;
 - b) in places where welding or flame cutting is executed;
 - c) on each floor of the buildings under construction
 - d) be fitted with fittings capable of being used by firefighters.

Type of construction	Transcript	Material	Construction Scheme	The degree of fire resistance of the construction material
Bearing	Outside walls	Two layers (25 mm) of gypsum plasterboard with high resistance to action of fire on each side of the wall		REI 30
Self-supporting	Interior walls	One layer (12.5 mm) of gypsum board with high resistance to action of fire on each side of the wall		REI 15
Enclosing	Filling Window holes	Plastic profile with metal reinforcement, double-glazed windows		EI 15

<p>Bearing</p>	<p>Columns</p>	<p>Bison - production of coatings for fire protection of air ducts, metal and wooden structures, reinforced concrete, as well as fire doors, etc.</p>		<p>R 30</p>
<p>Bearing</p>	<p>Overlap</p>	<p>"Knauf-Fireboard" of 20 mm Prozask Firepanel 12.5 mm Self-tapping screw 1st layer DR0308 Self-tapping screw 2 words DR0307 with washer 6.4 DIN 9021 Minplit Profile</p>		<p>REI 15</p>