

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

LEISURE CENTER IN MEHRING CITY, GERMANY

Explanatory note

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

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INTRODUCTION

The theme of the project for the implementation of complex architectural design was chosen "Leisure center in Mehring City, Germany".

From the very beginning of their introduction, leisure centers have a significant place in the life of the city and its inhabitants. The center of youth activity in Mehring is not just a multifunctional building, but also a great way to create a space that could unite and interest different layers of the city's community, both in age and by interests.

Nowadays, it is increasingly difficult for people to properly organize and allocate their time for leisure in such a way as to satisfy all their own and individual needs. This is a problem that requires some research in this area and a rational solution. After all, the main task of the cultural and educational center is to meet the differentiated cultural, educational and leisure needs of different groups of the population in a weekly or daily rest.

In such a multifunctional structure, various functions can be combined. For example, such as: swimming, gym, restaurant, exhibition halls, dance grounds, etc. The question of filling this type of building depends solely on the architect-designer or the wishes of the customer.

Among the population, such centers have long been gaining considerable popularity, however, architects and scientists have not paid enough attention to the modern stages of designing cultural and leisure institutions.

Therefore, this topic is relevant today and requires a deeper study of the main points regarding the filling of the building, its function, compactness, safety and imaginative solution. After all, young people are the future of our country that should grow, be educated, saturated with knowledge and enriched with impressions in the appropriate conditions of comfort and aesthetics of the environment.

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1 PRE-PROJECT RESEARCH

1.1 Analysis of the functional structure of the quarter.

Since the quarter is located in the heart of the city, it is a central public and

business area. Most of the territory is occupied by a residential area with residential buildings with and educational buildings a height of 2 to 4 floors.

In general, further design will focus on the recreational function of the loo quartet and the creation of a landscape group, which will be a linking element between the parks of neighboring quarters.

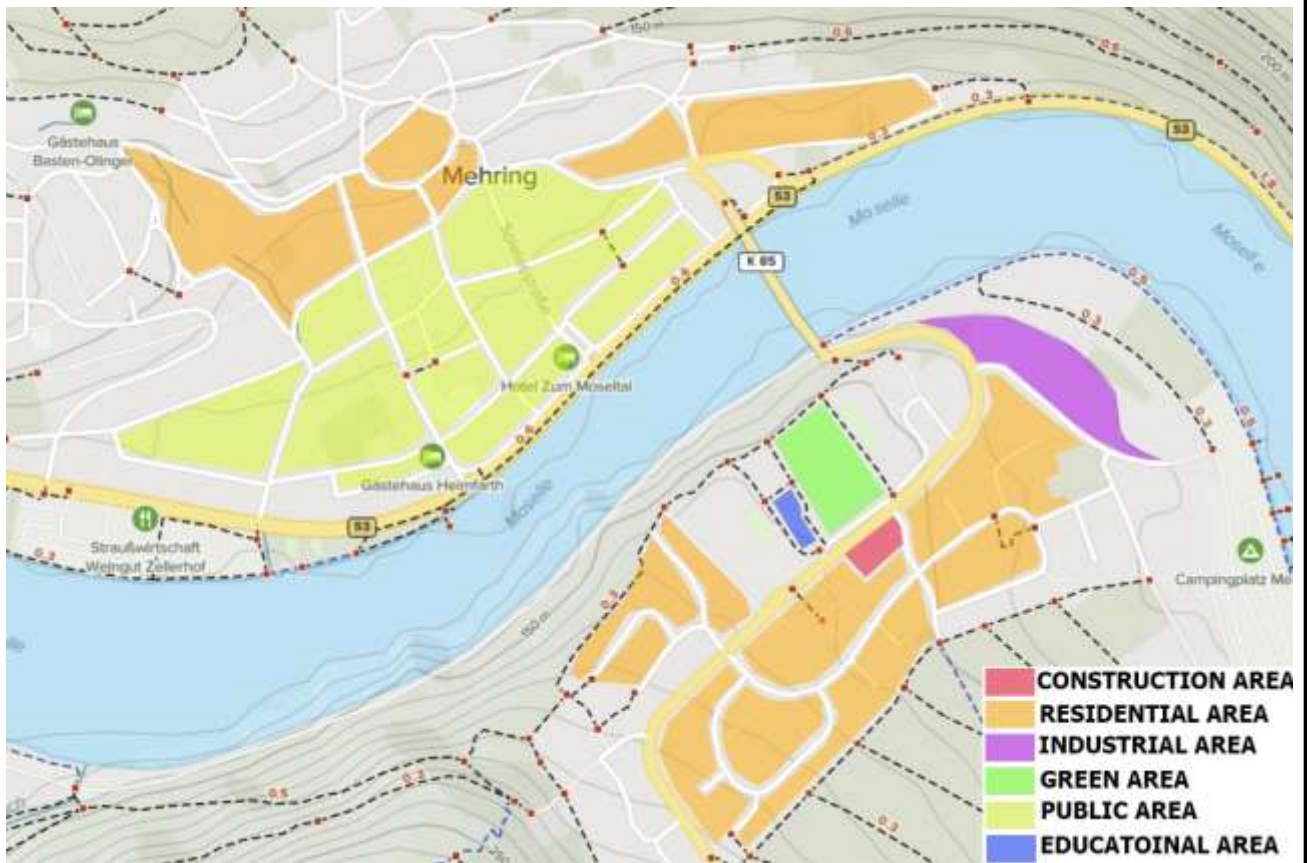


Fig.1 – Functional structure of the quarter.

1.2. Analysis of the street network and the nature of transport and pedestrian connections.

The quarter in which the design is carried out is surrounded on 2 sides by different streets, among which are: – Am Sportplatz (highway of district significance), from the two sides.

As for pedestrian flows, they are concentrated mainly along the sidewalks and several through the very center of the block. In general, the quarter is not provided with enough walking paths, which is certainly a minus for residents.

The project proposes a system of pedestrian communications of different widths, forming a landscape composition in the form of a small park. Larger aisles will link the building to the youth's business activities with a public transport stop and the sidewalk of the surrounding streets.

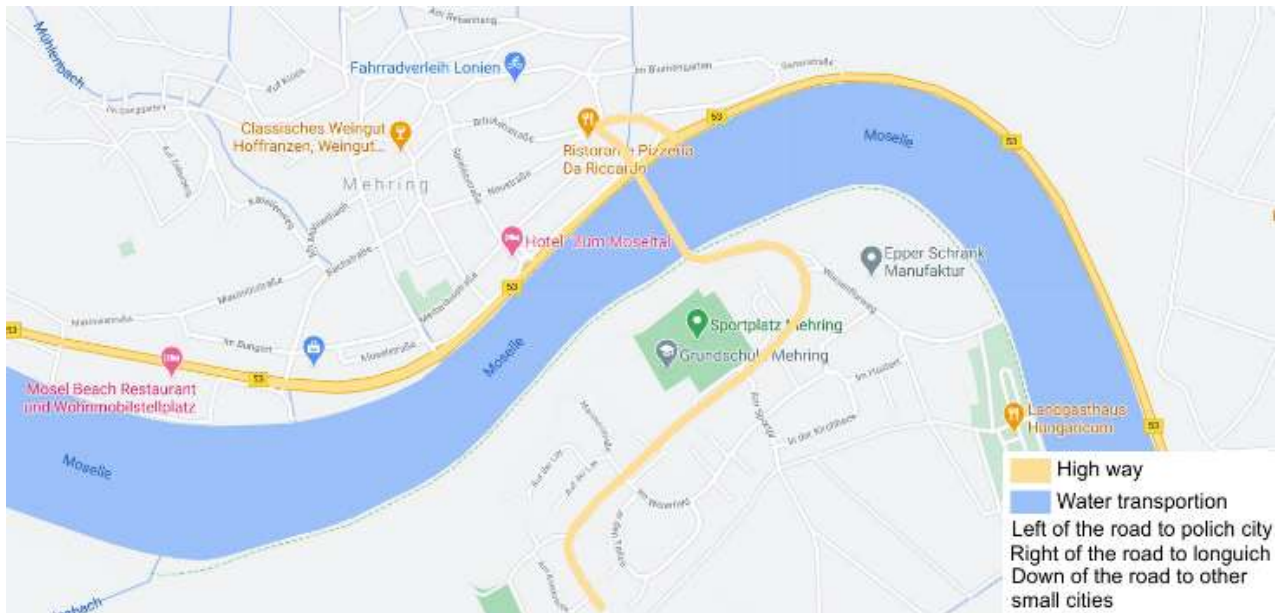


Fig.2 – Scheme of street-pedestrian network.

1.3 Feasibility indicators and sleeping quarter construction

The technical characteristics of the quarter are shown in Table 1.

Table 1

N/N	Name	Unit	Indicator
1	Total area	hectare	6,2
2	Building area	hectare	0.135
4	General public area	m ²	3780
5	Average number of floors	floor	2

2. URBAN PLANNING SOLUTION BUILDINGS OF THE QUARTER

2.1 General Provisions.

Reconstruction of the quarter is necessary, since most of the construction of its territory is in an inappropriate state, and there is no recreational area, which is mandatory in the construction of a cultural and educational center.

The pedestrian path system will depart from the building, as well as a small park area, which will create a wonderful recreational area in the quarter, which was lacking earlier.

2.2 Functional zoning of the territory

The main function of the neighborhood was residential. However, the project is proposed to make recreational activities the main function nearby, as residents of the city and the neighborhood itself lack park area in the area.

The nature of the inner space of the quarter is created by walking paths that break it into suitable areas, which are planted with lawn and partially planted with trees. The main focus in the landscape will be a small alley with hidden places to relax and there will be an area for playing yoga.



Fig.5 – Functional structure of the quarter.

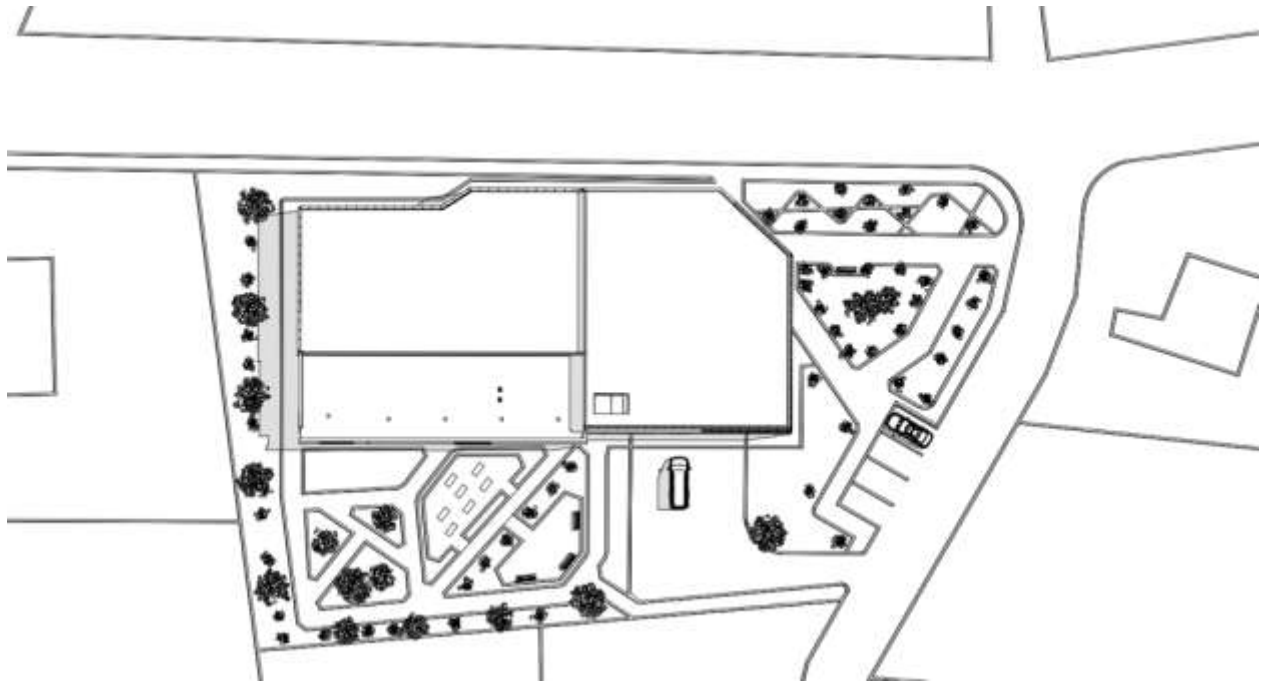


Fig.7 – Master plan.

2.5 Specifications

Specifications of the master plan before and after the reconstruction are given in table and 2.

Table 2

N/N	Name	Unit	Indicator before the reconstruction	Indicator after reconstruction
1	Total area	sq.m.	3780	3780
2	Building area	sq.m.	2200	1212
4	General public area	sq.m.	550	680
5	Average number of floors	floor	3	2

3. ARCHITECTURAL AND PLANNING SOLUTION OF THE BUILDING

3.1 Functional and planning solution

The building of the leisure building has 2 groundfloors .

1st Floor:

- Medical room
- Swimming block
- lobby block
- cash lobby block
- Gaming room
- Electrical and mechanical room
- Fitting room
- Billiard room
- offices room
- Sauna room
- Bar

2nd floor:

- administrative room
- gym block
- massage room
- dancing room
- fitting room

At the heart of the planning of the center in the business activity of young people is the reception of blocking individual parts of the building with different functioning parts. Thus, each block has the ability to function separately from each other, as well as divide the flow of people according to their needs to stay in the building.

The center provides evacuation exits from each unit separately and from the connecting atrium as well.

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3.2 Architectural and compositional solution

The architectural and compositional solution of the center in the business activity of people aims to unite the existing building of the quarter on the periphery, to emphasize its background the architectural monuments, as well as to highlight the central quarter of the city, making it the main one.

The object has a broken planning structure, consists of several volumes that differ in functions among themselves, but are connected by a single glass space – the atrium.

The composition of the building is geometric with a dominant technique – dynamics. It is created by small hinged long and thin elements made of light concrete, which become in rhythm, as well as massive rectangular hinged elements with openings. The impression of the element of the game, thanks to the dynamics of small and massive elements.

The choice of colors inherent in the building was influenced by the environment.

Use restrained minimalist colors: white. The accent of darkened glazing facades. Among the used materials: concrete, glass (Fig.8).



Fig. 8 – Figurative solution of the building

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3.3 Constructive solution

The structural scheme of the building is truss and columns . It is based on several meshes of columns, independent of each other. Reinforced concrete unified slabs, multiples of 320 mm, as well as in some places there are monolithic areas are laid between the floors.

The foundation is fawn with spacers under the column. The building has an underground floor.

Enclosing structures – multilayered ceramic concrete wall panels with insulation, 150 mm thick.

Internal walls – 150mm ceramic concrete panels.

Partitions – plasterboard with plastering 120mm, movable drum on a horizontal axis.

Stairs - two-car and three-car precast reinforced concrete. The width of the march is 1.35 m.

3.4 Specifications

The technical and economic characteristics of the building are shown in Table 3.

Table 3

NN	Name	Unit of measure	Indicator
1.	The area of the construction site	sq.m.	1212
2.	Number of floors	floor	2
3.	Total area	sq.m.	3780
5.	Area of service rooms	sq.m.	20
6.	Construction volume	cubic meters	10220
7.	The height of the premises	m	8,5; 7,5

4. Sections of related disciplines :

4.1 Architectural designs

A leisure centre is a large public building containing different facilities for leisure activities, such as a sports hall, a swimming pool, and rooms for meetings.

Leisure structures range in size from relatively small buildings, such as gymnasia, to larger buildings such as stadia which may be capable of holding 80,000 people. Each project comes with its own challenges, opportunities and efficient structural solution. They have unique requirements within the construction sector, as most modern developments are now multi-functional and have an inherent requirement to be state-of-the-art and distinctive. Unlike other types of more generic buildings, leisure structures tend to be quite specialist and architecturally driven with particular emphasis given to quality, function, flexibility and appearance. There is increasingly a focus on high levels of operational energy efficiency and use of renewable energy technologies in the leisure sector

The attributes of steel construction are well adapted for leisure facilities and are routinely used to optimize the design. This is primarily because it offers a cost-effective solution for bespoke, architecturally driven solutions such as stadia, as well as cost effective generic designs such as portal-framed sports halls. In addition, steel is a versatile and sustainable material which has an aesthetic appeal at both large and at small/detail-scale. It offers flexibility which can be very important for projects that are constrained by site or planning restrictions, or for venues which may wish to add to or reduce their overall capacity in the future, for example, grandstands for stadia hosting major sporting events. All sports stadia use steel construction as part of the functional and architectural solution

Trusses are one of the most common types of structure found in leisure buildings. They comprise an efficient arrangement of slender members and are generally more economical than standard rolled steel beams over relatively large spans.

4.2 Occupational safety

4.2.1 General provisions

The designed object is leisure centre. The building is located Mehring city Germany

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;

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- 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.

4.2.2. 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.

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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.

4.2.3. 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.

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