



BRNO UNIVERSITY OF TECHNOLOGY

VYSOKÉ UČENÍ TECHNICKÉ V BRNĚ

FACULTY OF CIVIL ENGINEERING
FAKULTA STAVEBNÍ

INSTITUTE OF BUILDING STRUCTURES
ÚSTAV POZEMNÍHO STAVITELSTVÍ

HOTEL

MAIN PART

DIPLOMA THESIS
DIPLOMOVÁ PRÁCE

AUTHOR
AUTOR PRÁCE

Bc. Richard Sasko

SUPERVISOR
VEDOUCÍ PRÁCE

Ing. KAREL STRUHALA

BRNO 2019



VYSOKÉ UČENÍ TECHNICKÉ V BRNĚ FAKULTA STAVEBNÍ

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ZADÁNÍ DIPLOMOVÉ PRÁCE

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Název	Hotel
Vedoucí práce	Ing. Karel Struhala
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Vedoucí ústavu

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PODKLADY A LITERATURA

(1) Směrnice děkana č. 19/2011 s dodatky a přílohami; (2) Katalogy a odborná literatura; (3) Stavební zákon č. 183/2006 Sb. ve znění pozdějších předpisů; (4) Vyhláška č. 499/2006 Sb. ve znění pozdějších předpisů; (5) Vyhláška č. 268/2009 Sb. ve znění pozdějších předpisů; (6) Vyhláška č. 398/2009 Sb.; (7) Platné normy ČSN, EN a ISO; (8) Vlastní dispoziční a architektonický návrh.

ZÁSADY PRO VYPRACOVÁNÍ

Zadání: Zpracování určené části projektové dokumentace pro provedení stavby hotelu.

Cíle: Vyřešení dispozice budovy s návrhem vhodné konstrukční soustavy a nosného systému na základě zvolených materiálů a konstrukčních prvků, včetně vyřešení osazení objektu do terénu s respektováním okolní zástavby. Práce bude zpracována v souladu s vyhláškou č. 499/2006 Sb. ve znění vyhlášky č. 405/2017 Sb. Obsaženy budou tyto části definované ve vyhlášce: A, B, C a D v rozsahu částí D.1.1 a D.1.3. Dále bude práce obsahovat: studii - předběžný návrh budovy a jejího dispozičního řešení - a přílohou část, ve které budou doloženy předběžné návrhy základů, případně rozměrů dalších nosných prvků řešené budovy a také prostorové vizualizace budovy. Výkresová část bude obsahovat výkresy: situace, základů, půdorysů všech podlaží, konstrukce zastřešení, svislých řezů, technických pohledů, min. 5 detailů, výkres(y) sestavy dílců, popř. výkres(y) tvaru stropní konstrukce. Součástí dokumentace budou i dokumenty podrobnosti dle D.1.1 bod c), stavebně-fyzikální posouzení objektu a vybraných detailů a případné další specializované části, zadané vedoucím práce.

Výstupy VŠKP bude členěna v souladu se směrnicí děkana č. 19/2011 a jejím dodatkem a přílohami. Jednotlivé části dokumentace budou vloženy do složek s klopami formátu A4 opatřených popisovým polem a uvedením obsahu na vnitřní straně každé složky. Všechny části dokumentace budou zpracovány s využitím PC v textovém a grafickém CAD editoru. Výkresy budou opatřeny popisovým polem. Textová část bude obsahovat i položky h) "Úvod", i) "Vlastní text práce" jejímž obsahem budou průvodní a souhrnná technická zpráva a technická zpráva pro provádění stavby podle vyhlášky č. 499/2006 Sb. ve znění vyhlášky č. 405/2017 Sb. a j) "Závěr".

STRUKTURA DIPLOMOVÉ PRÁCE

VŠKP vypracujte a rozčleňte podle dále uvedené struktury:

1. Textová část VŠKP zpracovaná podle Směrnice rektora "Úprava, odevzdávání, zveřejňování a uchování vysokoškolských kvalifikačních prací" a Směrnice děkana "Úprava, odevzdávání, zveřejňování a uchování vysokoškolských kvalifikačních prací na FAST VUT" (povinná součást VŠKP).
2. Přílohy textové části VŠKP zpracované podle Směrnice rektora "Úprava, odevzdávání, zveřejňování a uchování vysokoškolských kvalifikačních prací" a Směrnice děkana "Úprava, odevzdávání, zveřejňování a uchování vysokoškolských kvalifikačních prací na FAST VUT" (nepovinná součást VŠKP v případě, že přílohy nejsou součástí textové části VŠKP, ale textovou část doplňují).

Ing. Karel Struhala
Vedoucí diplomové práce

ABSTRACT

My diploma thesis deals with a design of a public building, in this case a hotel. It is the design of the project documentation, the result of which is the realization of an object that meets the standards of the Czech Republic as well as the demands and needs of the investor.

The building is designed as a two-storey, above-ground new building with twenty-two short-stay accommodation units providing a place for forty-two guests in total.

Technically it is one of the traditional Czech methods, clay brick. In this case, the bricks are from manufacturer HELUZ, they are abraded with built-in thermal insulation in its cavities.

The foundations are formed by foundation strips. The roof is flat with a slope of 2%. The building is located in Pezinok, Slovakia.

KEYWORDS

#hotel #HELUZ #miako #brick #2in1 #green roof # green roof #john davidson

ABSTRAKT

Moja diplomová práca sa zaoberá návrhom verejnej budovy, v tomto prípade hotelu. Jedná sa o dizajn projektovej dokumentácie, ktorej výsledkom je možná realizácia objektu, ktorý vyhovuje normám Českej republiky ako aj žiadostiam a potrebám investora.

Budova je navrhovaná ako dvojposchodová, nadzemná novostavba s dvadsiatimi dvoma ubytovacími jednotkami krátkodobého ubytovania ktoré poskytujú miesto pre štyridsiatich dvoch ubytovaných. Technicky sa jedná o jeden z tradičných českých spôsobov, tehla. V tomto prípade ide o tehly od výrobcu HELUZ, ktoré sú brúsené so zabudovanou tepelnou izoláciou priamo v dutinách tehly.

Základy tvoria základové pásy. Strecha je plochá so sklonom 2%.

Objekt je situovaný v časti Pezinok, Slovenska republika.

KLÍČOVÁ SLOVA

#hotel #HELUZ #miako #tehla #2in1 #zelena strecha #plocha strecha #john davidson

BIBLIOGRAPHIC CITATION

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DECLARATION OF CONFORMITY OF THE PRINTED AND ELECTRONIC FORM OF THE FINAL THESIS

I declare that the electronic form of the submitted master's thesis titled *Hotel* is identical to the submitted printed form.

Brno, 4. 12. 2018

Bc. Richard Sasko
author

DECLARATION OF AUTHORSHIP OF THE FINAL THESIS

I, Bc. Richard Sasko declare that this master's thesis titled *Hotel* is my own work and the result of my own original research. I have clearly indicated the presence of quoted or paraphrased material and provided references for all sources.

Brno, 4. 12. 2018

Bc. Richard Sasko
author

Thanksgiving:

Thank you to my supervisor Ing. Karel Struhala.

Thank you company ArchiCAD.

Without these two, I would not make it.

Poděkování:

Ďakujem za pomoc svojmu vedúcemu Ing. Karlovi Struhalovi.

Ďakujem spoločnosti ArchiCAD.

Bez týchto dvoch by som to nedokončil.

V Brně dne 12.12.2018

.....
podpis autora

Richard Sasko

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1. Introduction

The thesis deals with a design of a public building, in this case a hotel. It is the design of the project documentation, the result of which is the realization of an object that meets the standards of the Czech Republic as well as the demands and needs of the investor.

The building is designed as a two-storey, above-ground new building with twenty-two short-stay accommodation units providing a place for forty-two guests in total. Technically it is one of the traditional Czech methods, clay brick. In this case, the bricks are from manufacturer HELUZ, they are abraded with built-in thermal insulation in its cavities.

The foundations are formed by foundation strips. The roof is flat with a slope of 2%.

The building is located in Pezinok, Slovakia.



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HOTEL

OWN TEXT PART OF THE DIPLOMA THESIS
A. ACCOMPANYING REPORT

DIPLOMA THESIS
DIPLOMOVÁ PRÁCE

AUTHOR
AUTOR PRÁCE

Bc. Richard Sasko

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Ing. KAREL STRUHALA

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A.1.1 Own text part of the Diploma thesis

A.1.1 Data about construction

Construction: Hotel

Location: Suvorovova 2888/9, 902 01 Pezinok [846163], Slovakia

Cadastral area Pezinok [846163], Stará hora

Plot number 840/3, 840/24

A.1.2 Data about the builder

Builder: Richard Sasko and collective

Address: Suvorovova 2888/9, 902 01 Pezinok-Stará hora, Slovakia

A.1.3 Data about the designer

Designer: Richard Sasko

Address: Suvorovova 2888/9, 902 01 Pezinok-Stará hora, Slovakia

A.2 List of input data

- basic information about the resolutions or proceedings, based on which was the construction permitted (denotation of construction segment, name of authorised inspection, date of permission)

- basic information about the documentation or project documentation, based on which the building was designed

- additional background information:

- cadastral map of the plot and its further relations

- map of networks and infrastructures

- data about geodetic and altitude points of surrounding

A.3 Data about the plot

The plot number 840/3 and 840/24 are located in suburbs area of municipality Pezinok in Slovakia. The plot was chosen due to its strategic location. It is situated next to a newly built horse riding premises and riding hall which provides few annual international competitions and bring people to the area. The rest of the surrounded area is formed by fields and wine yards

The plot is in altitude 162 m.a.s.l and levelled. There is already existing road from the street along the southern border of plot with a width of 7.0 m.

Given plot is not located in any historical reserve, reserve of special protection.

Data about the plot

Plot number: 840/3, 840/24

Municipality: Pezinok [846163]

Cadastral area: Pezinok [846163], Stará hora

Acreage: 3807 m²

Type of plot: Plot of cadastral estate

Map sheet: DKM

Determination of acreage: from coordinates S-JTSK

Type of plot: plough land

List of affected plots according to cadastral estate:

- Plot number: 828/2, 828/4, 840/27, Plot type: Public communication
- Plot number: 840/2, 840/13, 830/23, Plot type: Plough land
- Plot number: 840/1, Plot type: Wine yard

Data about the soil

Plot is situated on quaternary soils as can be visible in map. Close geological survey shown there are two groups of soils with their specific geotechnical qualities which are labelled as geotechnical types (GT):

GT1 - Fluvial sediments

GT2 - Sedimentary sediments

GT2 can be described as particles of sedimentation of bottom accumulations in flood plains what generally speaking specifies the soil type as class F4 CS (Fluvial sandy clay). According to ČSN 73 1001 its Rdt equals 150 kPa.

Data about the traffic connection

Plot is connected to an already existing public communication which connects the plot with public road system. Driveway and paths will be built to connect the object with the existing roads on its plot border.

Data about the existing utility networks

Plot is not connected to any utility network and all connections have to be built. From the public communication, there is possibility of a connection to an AC low voltage, sewerage /mixed/, and potable water system. All connections are being brought to the plot as situation drawing shows.

Electrometer will be located on border of plot covered in masonry for visual purposes.

Data about fulfilment of regulation plan, zoning permit or land use planning according to § 104 article 1 of Building Law

All conditions are fulfilled. Building is in accordance with approved land use plan of the town of Pezinok.

Data about compliance of general requirements for construction

Fulfilled requirements of project documentation:

- Building Law 186/2006 Coll. and Notice no. 137/1998 Coll. about general requirements for construction
- Notice no.502/2006 Coll. about change of notice about general technical requirements for construction
- ČSN 73 4301 Residential buildings
- ČSN 73 0540 Thermal technology of buildings, and hygienic regulations and requirements about health protection and healthy living conditions

Data about fulfilment of requirements of concerned authorities

All documentations fulfil the requirements of concerned authorities.

A.4 Data about the construction

The building is designed with a purpose of usage for temporary or seasonal accommodation with maximal capacities of 42 people. It is placed in a suburban area situated by recently built horse riding facilities without previously available accommodational facilities.

It is founded on a side wall made of concrete blocks standing on a foundation strip. Construction is made of clay bricks from company Heluz, more exactly the vertical load-bearing structure is based on Heluz 50 2in1 with already installed thermal insulation in brick cavities and Heluz AKU 30, while the non load-bearing vertical

structure is based on Heluz 11.5. Horizontal load-bearing structure is also a product of company Heluz, more precisely ceramic ceiling Heluz MIAKO formed of ceiling joists and filling brick cartridges.

The building does not belong to any protected construction. Its energy protocol shows, the building belongs to category A.

Information regarding compliance with technical requirements ensuring barrier-free usage:

Building meets all general technical requirements for construction work in accordance with Decree 268/2009 Coll., on technical requirements for construction.

The build-up area:	935.21 m ²
Enclosed space:	1446.77 m ²
Acreage:	3807 m ²
Maximal height above the terrain:	8 600 mm
Number of residential units:	22
Number of parking places:	20 outside

Construction process:

- Foundations	4/2019
- Connection of engineering networks	4/2019
- Horizontal and vertical structures	5/2019
- Internal surfaces, flooring	7/2019
- Surface treatment, pavement	8/2019
- Building approval	9/2019

A.5 Division of the object into zones

House is divided into 4 zones. They are common, quiet, hygienic and personnel.



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OWN TEXT PART OF THE DIPLOMA THESIS
B. SUMMARY TECHNICAL REPORT

DIPLOMA THESIS
DIPLOMOVÁ PRÁCE

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B.1 Description of the plot

The plot number 840/3 and 840/24 are located in suburbs area of municipality Pezinok in Slovakia. The plot was chosen due to its strategic location. It is situated next to a newly built horse riding premises and riding hall which provides few annual international competitions and bring people to the area. The rest of the surrounded area is formed by fields and wine yards

The plot is in altitude 162 m.a.s.l and levelled. There is already existing road from the street along the southern border of plot with a width of 7.0 m.

Given plot is not located in any historical reserve, reserve of special protection.

Data about the plot

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GT2 can be described as particles of sedimentation of bottom accumulations in flood plains what generally speaking specifies the soil type as class F4 CS (Fluvial sandy clay). According to ČSN 73 1001 its Rdt equals 150 kPa.

B.2 General description of the building

B.2.1 Purpose of the object, basic capacity of function unit

The building is designed with a purpose of usage for temporary or seasonal accommodation with maximal capacities of 42 people. It is placed in a suburban area situated by recently built horse riding facilities without previously available accommodational facilities. The construction is resulting in an object that meets the standards of the Czech Republic as well as the demands and needs of the investor. The building is designed as a two-storey, above-ground new building.

B.2.1.1 Urban and architectural solution

The plot is located across the road from to a newly built horse riding premises and riding hall which provides few annual international competitions and bring people to the area. The rest of the surrounded area is formed by fields and wine yards

It is a two floor building with a traditional disposition of room interior. Its 1st above ground floor consists of customer bedrooms, public restaurant, play room and most of personnel facilities as office, meeting room, storage rooms and most importantly kitchen area. The 2nd above ground floor consists of additional customer bedrooms, customer meeting room, technical room and storage space.

The hotel is accessible either by main entrance which is reserved for incoming customers of the hotel or a restaurant and leads to a reception, or by two side entrances designated for employees and suppliers. Restaurant side entrance is not meant to be used as an entrance into the building but only as possible exit to a garden or a playground. Last side entrance located at the end of a corridor is only for emergency purposes used as an emergency exit in case of a necessity.

The building is generally divided into two areas – a public and one accessible for designated personnel only.

The 1st above ground floor quiet zone forms twelve rooms where each of them disposes of bedroom area and own private bathroom with shower and toilet and take in 22 people in total. Restaurant area has bar area, entrance to kitchen area and an exit to the back garden.

The 2nd above ground floor quiet zone forms ten rooms where each of them disposes of bedroom area and own private bathroom with shower and toilet and take in 20 people in total. The meeting room can accommodate up to 40 people. The technical room, ventilation room and storage room are only areas accessible for personnel only. All HVAC features can be found in the ventilation room. The 2nd above ground floor dispose of two customer available terrace spaces, one accessible from corridor and the other from the meeting room.

The floor level of the 1st above ground floor stated as 0.000 refers to 162.m.a.s.l.

External façade consists purely of external plaster in one colour, currently designed as white and provided by company Cemix.

Windows, external and internal doors are designed in accordance with products from a company Eurookna TTK.

B.2.1.2 Layout and operational solutions, production technology

It is a two floor hotel building with a traditional disposition of room interior. Its 1st above ground floor consists of customer bedrooms, public restaurant, play room and most of personnel facilities as office, meeting room, storage rooms and most importantly kitchen area. The 2nd above ground floor consists of additional customer bedrooms, customer meeting room, technical room and storage space.

The building is generally divided into two areas – a public and one accessible for designated personnel only.

B.2.1.3 Barrier-free usage of the building

The building is designed as a barrier-free. Provides parking, entrance, room on a 1st above ground floor, public barrier-free toilet and barrier-free adjusted staircase. Details can be seen in drawings and calculation of staircase.

B.2.1.4 Safety during usage

The building is designed and must be built so that there is no risk in its usage. Balustrades and handrails of stairs and terrace are designed to satisfy minimal height of 900 mm. All materials have to be certified and safe. Bathroom and terrace floors have to be equipped with anti-skid ceramic tiles.

B.2.1.5 Basic technical description of the building

-Foundations:

Foundations consist of foundation strips of width 1000, 1300 and 1400 mm and depth 1200 and 1400 mm with concrete reinforced blocks wall on its top located under every load-bearing wall.

-Waterproofing:

Waterproofing is provided by modified SBS bitumen sheet Multiplex Super AL that can be used as well as anti-radon layer. The roof waterproofing is also formed by modified SBS bitumen sheets with bottom layer formed by PE. Modified SBS bitumen is used as vapour barrier.

-Vertical load-bearing structures:

The peripheral and internal walls are based on same material. Base form clay bricks from company Heluz, more exactly the vertical load-bearing structure is based on Heluz 50 2in1 with already installed thermal insulation in brick cavities and Heluz AKU 30, while the non load-bearing vertical structure is based on Heluz 11.5.

In case of peripheral walls, Heluz 50 2in1 is used. External protection of the bricks is formed by a cement spraying, penetration and surface finish mortar composition designed according to a recommended mortar system from company Helux, based on products from company Cemix.

Internal surface is formed according to a system from company Rigips and based on gypsum plasterboards on a layer of adhesive binder spread in accordance to recommended layout. This method is so called placing on targets where mortar is layered on wall, in distance of 300 to 350 mm from each other.

Internal walls are formed by Heluz 11.5 covered by gypsum plasterboards from both sides using the same method of targets as with internal surface of peripheral walls.

-Horizontal load-bearing structures:

Horizontal load-bearing structure is also a product of company Heluz, more precisely ceramic ceiling Heluz MIAKO formed of ceiling joists and filling brick cartridges.

Additional layer for floors is formed by step insulation made of 40 mm of elasticized

polystyrene, 60 mm of grouting layer of concrete screed, 10 mm of levelling screed and top layer of 15 mm of laminate flooring or ceramic tiles.

Ceilings are equipped by additional gypsum plasterboards used as suspended ceiling providing an installation gap necessary for all connections.

-Roof structure:

Roof is considered as a flat roof with its slope of 2 %. Project involves two types of roof- green and terrace.

Their common layers are layers of thermal insulation and vapour barrier and waterproofing. Thermal insulation is EPS 200 polystyrene from a company Isover. Levelling layer is also formed by EPS 200 polystyrene. Waterproofing as mentioned is a modified SBS bitumen sheet Multiplex Super AL in two layers separated on top and bottom by layer of geotextile.

Terrace roof then continues with an air gap with rectifying pads and concrete tiles placed on the top of them.

The top layer of green roof consists of drainage and water accumulation layer of a dimple membrane 20mm, filtration layer of geotextile and 70 mm of vegetation, extensive substrate for succulents.

Compositions as well as materials are based on company Borner.

Load bearing construction is formed by ceramic ceiling Heluz Miako.

-Thermal insulation:

Thermal insulation is built-in inside the cavities of peripheral clay bricks Heluz 50 2in1 which are being used in the project.

Thermal insulation of the roof is EPS 200 polystyrene from a company Isover and in case of foundations Styrodur 4000 CS from company Isover.

-Windows and doors

Windows and doors are supplied by a company Eurookna TTK.

Windows are TTK comfort plus with their heat transfer coefficient value of $U_W = 0.6 \text{ W/m}^2 \cdot \text{K}$. External doors are TTK comfort plus with their heat transfer coefficient value of $U_D = 0.7 \text{ W/m}^2 \cdot \text{K}$.

-Technical and technological equipment:

Bathroom with shower sink and toilet is located in every accommodation unit. Twenty-two in total. Public toilets are accessible in both floors with nine toilets in the 1st above ground floor and 7 in the 2nd above ground floor.

There are three sinks in the kitchen area with two dishwashers.

Piping for sewerage, drinking water and electricity enters through passages in concrete block wall. Size of passages is set according to necessary dimensions of piping.

All pipeline is located on dropped ceiling and distributed into the building

Installation shafts are located in bathroom wall of every unit rising into the unit above and sewerage ventilation pipe continues to the roof.

Installation shafts for rain are located in rooms 114, 127, 129, 142 and 148 where only those in 114 and 142 are reaching the top roof.

B.2.1.6 Fire safety solution

The fire safety report deals with a project of newly build hotel for maximal capacities of 42 people. Construction is made of clay bricks from company Heluz and whole object is considered to be of group OB3.

The object is designed according to ČSN 730802 in accordance with its following project standards, in particular ČSN 730835. The building is divided into 30 fire compartments. Fire resistance of the building structure meets the requirements for each individual fire compartment. In the building there is a non-protected escape route of satisfactory parameters. Standoff distances reach only the investor's land, the condition is satisfactory.

Escape ways comply requirements (2000 > 900 mm).

Access road comply requirements (7.0m > 3.0m).

Building meets required conditions given by ČSN

B.2.1.7 Principles of energy management

The protocol for the thermal evaluation of the building envelope sets that building fulfils all requirements given by standards and is classified as building class A. (folder n.6).

B.2.1.8 Hygienic, working and communal requirements

Air distribution of all accommodation units is provided by a heat pump unit situated on the roof with inlet through the façade.

Public areas and kitchen area air distribution is provided by HVAC unit located in the Ventilation room 228 with inlet through the façade.

Ventilation of the building can be provided by natural ventilation via windows and doors.

Heating is provided by heat pump units.

B.2.1.9 Principles of protection of building against negative effects of environment

The house is protected against radon by anti-radon layer in modified SBS bitumen sheet Multiplex Super AL.

All requirements for noise protection are being met. Protection against noise is ensured by a dampening insulation in the floors and acoustic internal walls and supported by calculation which's outcome is satisfying wit requirements.

B.3 Connection to an infrastructure

From the public communication, there is possibility of a connection to an AC low voltage, sewerage /mixed/, and potable water system. All connections are being brought to the plot.

Piping for sewerage, drinking water and electricity enters through passages in concrete block wall. Size of passages is set according to necessary dimensions of piping.

List of connections:

- Sewerage connection, approximate length 30 m, own sewer inspection shaft Ø 600mm
 - Rain sewerage connection, approximate length 83 m, own rain water storage tank 10.0 m³, own dry well
 - Potable water connection, approximate length 30 m, own water meter shaft Ø 700mm
 - AC low voltage connection, approximate length 30 m, own main box with electrometer
- Electrometer will be located on border of plot.

B.4 Traffic solution

Plot is connected to the already existing public communication from the street along the southern border of plot with a width of 7.0 m which connects the plot with public road system. Driveway and paths will be built to connect the object with the existing roads on its plot border.

B.5 Vegetation and terrain solution

Plot is covered in grass and new trees and bushes are planted to separate sauna and Jacuzzi from the hotel.

B.6 Description of the effects of construction on the environment and its protection

All used materials satisfy hygienic standards for emissions and foreign substances. In surrounding of construction are not any historical trees or endangered species locations. There is no area of protected bird colony from Natura 2000.

Construction has no negative effect on the environment.

Usage of a green roof on most of the roof provides additional environmental and comfort benefits.

B.7 Protection of population

The building meets all conditions of regulatory plan in accordance to Decree n. 280/2002 Coll., preparation and execution of the tasks of civil protection.

B.8 Principles of construction organization

- For erection is needed an electricity connection from the beginning to supply the equipment.
- Drainage is not planned ahead. In case of need, water pump will be used.
- Demolition of any obstacles is not necessary.
- All waste materials will be recycled by builder or user.
- Dry toilet is needed to be brought to the site.
- Working safety is necessary to be followed. Hardhats, glasses and protective footwear is mandatory.



BRNO UNIVERSITY OF TECHNOLOGY

VYSOKÉ UČENÍ TECHNICKÉ V BRNĚ

FACULTY OF CIVIL ENGINEERING
FAKULTA STAVEBNÍ

INSTITUTE OF BUILDING STRUCTURES
ÚSTAV POZEMNÍHO STAVITELSTVÍ

HOTEL

OWN TEXT PART OF THE DIPLOMA THESIS
D.1.1- TECHNICAL REPORT

DIPLOMA THESIS
DIPLOMOVÁ PRÁCE

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D.1.1 Technical report

1 Solution of construction

1.1 Architectonic solution

The building is designed with a purpose of usage for temporary or seasonal accommodation with maximal capacities of 42 people. It is placed in a suburban area situated by recently built horse riding facilities without previously available accommodational facilities. The construction is resulting in an object that meets the standards of the Czech Republic as well as the demands and needs of the investor. The building is designed as a two-storey, above-ground new building.

The plot is located across the road from to a newly built horse riding premises and riding hall which provides few annual international competitions and bring people to the area. The rest of the surrounded area is formed by fields and wine yards.

1.2 Art solution

External façade consists purely of external plaster in one colour, currently designed as white and provided by company Cemix.

Windows, external and internal doors are designed in accordance with products from a company Eurookna TTK.

1.3 Material solution

It is founded on a side wall made of concrete blocks standing on a foundation strip. Construction is made of clay bricks from company Heluz, more exactly the vertical load-bearing structure is based on Heluz 50 2in1 with already installed thermal insulation in brick cavities and Heluz AKU 30, while the non load-bearing vertical structure is based on Heluz 11.5. Horizontal load-bearing structure is also a product of company Heluz, more precisely ceramic ceiling Heluz MIAKO formed of ceiling joists and filling brick cartridges.

1.4 Disposition and operational solutions

It is a two floor hotel building with a traditional disposition of room interior. Its 1st above ground floor consists of customer bedrooms, public restaurant, play room and most of personnel facilities as office, meeting room, storage rooms and most

importantly kitchen area. The 2nd above ground floor consists of additional customer bedrooms, customer meeting room, technical room and storage space.

The building is generally divided into two areas – a public and one accessible for designated personnel only.

The build-up area:	935.21 m ²
Enclosed space:	1446.77 m ²
Acreage:	3807 m ²
Maximal height above the terrain:	8 600 mm
Number of residential units:	22
Number of parking places:	20 outside

2. Barrier-free usage of the building

Information regarding compliance with technical requirements ensuring barrier-free usage:

Building meets all general technical requirements for construction work in accordance with Decree 268/2009 Coll., on technical requirements for construction.

The building is designed as a barrier-free. Provides parking, entrance, room on a 1st above ground floor, public barrier-free toilet and barrier-free adjusted staircase. Details can be seen in drawings and calculation of staircase.

3. Structural and construction-technical solution

-Foundations:

Foundations consist of foundation strips of width 1000, 1300 and 1400 mm and depth 1200 and 1400 mm with concrete reinforced blocks wall on its top located under every load-bearing wall.

-Waterproofing:

Waterproofing is provided by modified SBS bitumen sheet Multiplex Super AL that can be used as well as anti-radon layer. The roof waterproofing is also formed by modified SBS bitumen sheets with bottom layer formed by PE. Modified SBS bitumen is used as vapour barrier.

-Vertical load-bearing structures:

The peripheral and internal walls are based on same material. Base form clay bricks from company Heluz, more exactly the vertical load-bearing structure is based on Heluz 50 2in1 with already installed thermal insulation in brick cavities and Heluz AKU 30, while the non load-bearing vertical structure is based on Heluz 11.5.

In case of peripheral walls, Heluz 50 2in1 is used. External protection of the bricks is formed by a cement spraying, penetration and surface finish mortar composition designed according to a recommended mortar system from company Helux, based on products from company Cemix.

Internal surface is formed according to a system from company Rigips and based on gypsum plasterboards on a layer of adhesive binder spread in accordance to recommended layout. This method is so called placing on targets where mortar is layered on wall, in distance of 300 to 350 mm from each other.

Internal walls are formed by Heluz 11.5 covered by gypsum plasterboards from both sides using the same method of targets as with internal surface of peripheral walls.

-Horizontal load-bearing structures:

Horizontal load-bearing structure is also a product of company Heluz, more precisely ceramic ceiling Heluz MIAKO formed of ceiling joists and filling brick cartridges. Additional layer for floors is formed by step insulation made of 40 mm of elasticized polystyrene, 60 mm of grouting layer of concrete screed, 10 mm of levelling screed and top layer of 15 mm of laminate flooring or ceramic tiles.

Ceilings are quipped by additional gypsum plasterboards used as suspended ceiling providing an installation gap necessary for all connections.

-Roof structure:

Roof is considered as a flat roof with its slope of 2 %. Project involves two types of roof- green and terrace.

Their common layers are layers of thermal insulation and vapour barrier and waterproofing. Thermal insulation is EPS 200 polystyrene from a company Isover. Levelling layer is also formed by EPS 200 polystyrene. Waterproofing as mentioned is

a modified SBS bitumen sheet Multiplex Super AL in two layers separated on top and bottom by layer of geotextile.

Terrace roof then continues with an air gap with rectifying pads and concrete tiles placed on the top of them.

The top layer of green roof consists of drainage and water accumulation layer of a dimple membrane 20mm, filtration layer of geotextile and 70 mm of vegetation, extensive substrate for succulents.

Compositions as well as materials are based on company Borner.

Load bearing construction is formed by ceramic ceiling Heluz Miako.

-Thermal insulation:

Thermal insulation is built-in inside the cavities of peripheral clay bricks Heluz 50 2in1 which are being used in the project.

Thermal insulation of the roof is EPS 200 polystyrene from a company Isover and in case of foundations Styrodur 4000 CS from company Isover.

-Windows and doors

Windows and doors are supplied by a company Eurookna TTK.

Windows are TTK comfort plus with their heat transfer coefficient value of $U_w = 0.6 \text{ W/m}^2 \cdot \text{K}$. External doors are TTK comfort plus with their heat transfer coefficient value of $U_D = 0.7 \text{ W/m}^2 \cdot \text{K}$.

-Floors:

Two basic types of top layer are used in interior. Laminate flooring or ceramic tiles.

Path on the level of 1st above ground floor is made of interlocking pavement surrounding the house peripheral walls in distance of 800 mm and parking area is covered in interlocking pavement which provides drainage and partial grass surface.

External terrace on the 2nd above ground floor is formed by rectifying pads and concrete tiles 30x30 cm.

-Stairs:

Staircase flight is a prefabricated concrete piece. Designed width of stairs is 1500 mm. Number of stairs is 24. Calculated width of tread is 300 mm which is in limits, height is 164 mm that is in limits as well. The slope of the staircase is 27.9°.

All dimensions are adapted as much as possible to barrier-free requirement of an optimal size of tread of 300 mm and slope of 28°.

-Technical and technological equipment:

Bathroom with shower sink and toilet is located in every accommodation unit. Twenty-two in total. Public toilets are accessible in both floors with nine toilets in the 1st above ground floor and 7 in the 2nd above ground floor.

There are three sinks in the kitchen area with two dishwashers.

Piping for sewerage, drinking water and electricity enters through passages in concrete block wall. Size of passages is set according to necessary dimensions of piping.

All pipeline is located on dropped ceiling and distributed into the building

Installation shafts are located in bathroom wall of every unit rising into the unit above and sewerage ventilation pipe continues to the roof.

Installation shafts for rain are located in rooms 114, 127, 129, 142 and 148 where only those in 114 and 142 are reaching the top roof.

- Chimney

House is not equipped by a chimney.

-Ventilation

Air distribution of all accommodation units is provided by a heat pump unit situated on the roof with inlet through the façade.

Public areas and kitchen area air distribution is provided by HVAC unit located in the Ventilation room 228 with inlet through the façade.

Ventilation of the building can be provided by natural ventilation via windows and doors.

4. Building physics

The protocol for the thermal evaluation of the building envelope sets that building fulfils all requirements given by standards and is classified as building class A.

3. Conclusion

The thesis deals with a design of a hotel. It is the design of the project documentation, which may result in its realization where the object must meet the standards of the Czech Republic as well as the demands and needs of the investor.

The building is designed as a two-storey, above-ground new building with twenty-two short-stay accommodation units providing a place for forty-two guests in total.

Technically it is a clay brick construction. The bricks are abraded, with built-in thermal insulation in its cavities. Building is classified as A class.

The foundations are formed by foundation strips. The roof is flat with a slope of 2%.

The building is located in Pezinok, Slovakia.

The project documentation was based on an assignment of diploma thesis and gradually worked out from segment of architectonic study and disposition of the hotel through situations, architectonic solution of elevations and sections, building construction solution containing foundations, slabs, roof and details to calculations of foundations, fire safety, stairs, building envelope and this technical report.

All issues on its way were consulted and corrected the best possible way while zigzagging between legislations and desired outcome.

4. List of used sources

Related standards and laws

ČSN 73 0540 - 1,2,3,4 Tepelná ochrana budov.

ČSN 73 0833 Požární bezpečnost staveb – Budovy pro bydlení a ubytování. ČSN 73 0802 Požární bezpečnost staveb – Nevýrobní objekty.

ČSN 73 0810 Požární bezpečnost staveb – Společná ustanovení

ČSN 73 0873 Požární bezpečnost staveb – Zásobování požární vodou ČSN 73 4301
Obytné budovy

ČSN 73 0580 Denní osvětlení budovy

ČSN 73 0532 Akustika, ochrana proti hluku v budovách

ČSN 01 3420 – Výkresy pozemních staveb – kreslení výkresů Zákon č. 183/2006 Sb. o
územním plánování a stavebním řádu. Vyhláška č. 268/2009 Sb. o technických
požadavcích na stavby Vyhláška č. 62/2013 Sb. o dokumentaci staveb

Vyhláška 499/2006 Sb., o dokumentaci staveb

Vyhláška 23/2008 Sb., o technických podmínkách požární ochrany staveb Vyhláška
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Books

<http://library.fce.vutbr.cz/>

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Ching, Francis D K, Mulville, Mark. European building construction illustrated

Internet sources

Drawings support:

<https://www.heluz.cz/>

<http://www.kalekim.com/english/index.asp>

<https://www.rigips.cz/>

<https://www.archdaily.com/>

<https://www.cemix.cz/>

<https://www.isover.cz/en>

<http://www.boerner.cz/>

<http://www.copycentrum-brno.cz/>

Situation:

<https://www.katasterportal.sk/kapor/>

<https://www.premac.sk/>

<https://www.mirosep.sk/nadrze-na-dazdovu-vodu>

<http://www.saunabau.sk/>

<http://www.pletivo-na-plot.cz/>

Foundations:

<https://www.heluz.cz/>

<https://www.isover.cz/en>

Floors:

<https://www.hornbach.sk/>

<https://www.heluz.cz/>

<http://www.kalekim.com/english/index.asp>

<http://www.boerner.cz/>

Walls:

<https://www.heluz.cz/>

<https://www.rigips.cz/>

<https://www.cemix.cz/>

Windows and doors:

<https://www.euroknattk.cz/en/>

Stairs:

<https://www.prefa.cz/>

Roof:

<https://www.heluz.cz/>

<http://www.boerner.cz/>

<https://www.isover.cz/en>

5. List of used abbreviations and symbols

Coll.	collocation
ČSN	česká státní norma = Czech state standard FC fire compartment
S-JTSK network	jednotné trigonometrická síť katastrální = uniform trigonometric cadastral
VŠKP	vysokoškolská kvalifikační práce = university qualification work minminimal
n.	number
par	paragraph
KVC	structural beam
OSB	oriented strand board
mm	milimeter
m	meter
th.	thickness
SC	scale

6. List of annexes

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