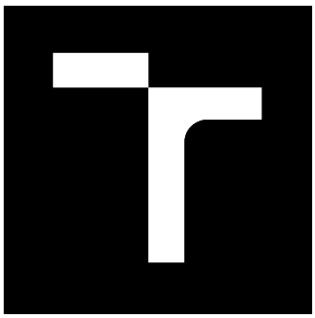

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FACULTY OF CIVIL ENGINEERING

FAKULTA STAVEBNÍ

INSTITUTE OF BUILDING STRUCTURES

ÚSTAV POZEMNÍHO STAVITELSTVÍ

CHALET

HORSKÁ CHATA

BACHELOR'S THESIS

BAKALÁŘSKÁ PRÁCE

AUTHOR — Róbert Banič

AUTOR

SUPERVISOR — Ing. František Vajkay, Ph.D.

VEDOUCÍ PRÁCE

BRNO 2018

VYSOKÉ UČENÍ TECHNICKÉ V BRNĚ
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Studijní program	B3607 Civil Engineering
Typ studijního programu	Bakalářský studijní program v anglickém jazyce a prezenční formou studia
Studijní obor	3608R001 Pozemní stavby
Pracoviště	Ústav pozemního stavitelství

ZADÁNÍ BAKALÁŘSKÉ PRÁCE

Student	Róbert Banič
Název	Chalet
Vedoucí práce	Ing. František Vajkay, Ph.D.
Datum zadání	30. 11. 2017
Datum odevzdání	25. 5. 2018

V Brně dne 30. 11. 2017

prof. Ing. Miloslav Novotný, CSc.	prof. Ing. Rostislav Drochytka, CSc., MBA
Vedoucí ústavu	Děkan Fakulty stavební VUT

PODKLADY A LITERATURA

(1) Směrnice děkana č. 19/2011 s dodatky a přílohami; (2) Katalogy odborných firem 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) Další související vyhlášky, (8) Platné normy ČSN, EN; (9) Vlastní dispoziční a architektonický návrh.

ZÁSADY PRO VYPRACOVÁNÍ

Zadání: Zpracování určené části projektové dokumentace pro provádění stavby nepodsklepené zadané budovy. **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. Dokumentace bude v souladu s vyhláškou č. 62/2013 Sb. obsahovat část A, část B, část C a část D v rozsahu části D.1.1 a D.1.3. Dále bude obsahovat studie obsahující předběžné návrhy budovy a jeho dispozičního řešení a přílohovou část obsahující předběžné návrhy základů a rozměrů nosných prvků řešené budovy a prostorovou vizualizaci budovy. Výkresová část bude obsahovat výkresy: situací, základů, půdorysů zadaných 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, popř. další specializované části, budou-li zadány 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. 62/2013 Sb. a j) "Závěr".

STRUKTURA BAKALÁŘSKÉ PRÁCE

VŠKP vypracujte a rozčleňte podle dále uvedené struktury:

1. Textová část VŠKP zpracovaná podle Směrnice rektora "Úprava, odevzdávání, zveřejňování a uchovávání vysokoškolských kvalifikačních prací" a Směrnice děkana "Úprava, odevzdávání, zveřejňování a uchovávání vysokoškolských kvalifikačních prací na FAST VUT" (povinná součást VŠKP).

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

Ing. František Vajkay, Ph.D.
Vedoucí bakalářské práce

Abstract

The subject of this bachelor´s thesis is a design and project documentation of a two-floor chalet for rent capable to accommodate up to 10 people. The building is located in a town of a mountain area in the north of Czechia called Pec pod Sněžkou. From architectural point of view the building is intended to stand out by its luxurious appearance whilst using natural materials and finishes such as wood, stone and glass, thus respecting natural character of the surrounding. From structural point of view the building is designed as a wooden house – Avanta systeme, with a small basement (boiler room) and garage for 2 cars with concrete blocks walls, flat roof and sloped roof above a middle part of the building.

Keywords

Chalet, two-floor, wooden structure, Avanta systeme, concrete blocks, flat roof, shed roof, luxurious appearance

Abstrakt

Předmětem této bakalářské práce je návrh a projektová dokumentace, dvoupatrové chaty k pronájmu, s kapacitou 10 lůžek. Budova je situována v obci Pec pod Sněžkou v horské oblasti severního Česka. Z architektonického pohledu má budova za cíl vyčnívat její luxusním vzhledem popři využití přírodních materiálů jako dřevo, kámen a sklo, a tedy, respektující přírodní charakter prostředí. Z technického pohledu je budova navržena ze dřeva - Avanta systeme, s malým suterénem (technická místnost) a garáží pro 2 auta se stěnami z bednicích betonových tvarovek, rovnou střechou a pultovou střechou uprostřed objektu.

Klíčová slova

Chata, dvoupatrový, dřevěná konstrukce, Avanta systeme, bednící tvarovky, rovná střecha, pultová střecha, luxusní vzhled

Bibliografická citace VŠKP

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Prohlášení:

Prohlašuji, že jsem diplomovou práci zpracoval(a) samostatně a že jsem uvedl(a) všechny použité informační zdroje.

V Brně dne 24. 5. 2018

…….

Róbert Banič
Autor práce

PROHLÁŠENÍ O SHODĚ LISTINNÉ A ELEKTRONICKÉ FORMY VŠKP

Prohlašuji, že elektronická forma odevzdané typ práce je shodná s odevzdanou listinnou formou.

V Brne dne 24. 5. 2018

- -

Róbert Banič
Autor práce

Thanks

First of all, I would like to thank my supervisor Ing. František Vajkay, Ph.D. for professional attitude, guidance and his willingness. I want to thank the architects and designers that helped me a lot. To classmates thanks to whom I enjoyed the study. To my parents who were encouraging me, supporting me and trusted in me. Last but not least, thank God who led me throughout my study and never let me down in the difficulties I went through over the course of 4 years.

Poďakovanie

V prvom rade by som chcel poďakovať môjmu vedúcemu Ing. Františkovi Vajkayovi, Ph.D. za profesionálny prístup, rady a ochotu. Chcem poďakovať architektom a dizajnérom, ktorí mi veľmi pomohli. Ďalej mojim spolužiakom, vďaka ktorým bolo som si štúdium užil. Ďakujem mojim rodičom, ktorí ma povzbudzovali, podporovali a verili vo mňa. V neposlednom rade, ďakujem Bohu, ktorý ma viedol počas celého štúdia a pomohol vo všetkých ťažkostiach, ktoré sa počas 4 rokov vyskytli.

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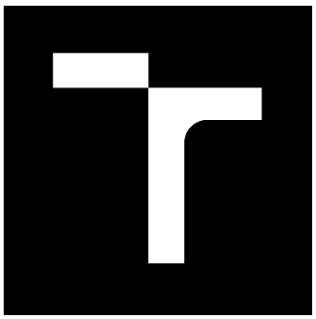
1. INTRODUCTION

The subject of this bachelor´s thesis is a design and project documentation of a two-floor chalet for rent capable to accommodate up to 10 people. The building is located in a town of a mountain area in the north of Czechia called Pec pod Sněžkou.

From architectural point of view the building is intended to stand out by its luxurious appearance whilst using natural materials and finishes such as wood, stone and glass, thus respecting natural character of the surrounding.

From structural point of view the building is designed as a wooden house – Avanta systeme, with a small basement (boiler room) and garage for 2 cars with concrete blocks walls, flat roof of a 2° inclination and shed roof of 13° inclination above a middle part of the building. Vertical structures have wooden based – vertical studs 140x70mm filled with mineral wool. Outdoor finishes are designed as ventilated façade. Horizontal structures are made of wooden beams. The plot is on a sloped terrain of 13° inclination.

The building was designed according Czech national standards.



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CHALET

HORSKÁ CHATA

A – ACCOMPANYING REPORT

BACHELOR'S THESIS

BAKALÁŘSKÁ PRÁCE

AUTHOR — Róbert Banič

AUTOR

SUPERVISOR — Ing. František Vajkay, Ph.D.

VEDOUCÍ PRÁCE

BRNO 2018

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A.1 Identification data

A.1.1 Information about the building

Name of construction:	Chalet
Place of construction:	cadastral area [718637]
parcel number	79/1
Township:	Pec pod Sněžkou [579581]
Region:	Jihomoravský
Subject of documentation:	Documentation for execution of works

A.1.2 Data about the builder

Name:	AVANTA SYSTEME spol. s.r.o.
Address:	Horova 62, 616 00 Brno, Czech republic
E-mail:	info@avanta.cz
Phone:	+420 541 240 525

A.1.3 Data about the designer

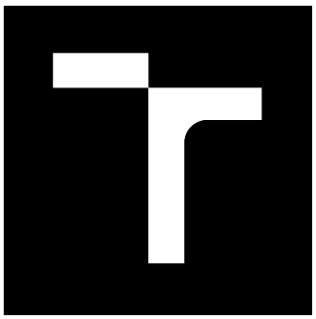
Name:	Róbert Banič
Address:	Družstevná 23, 971 01 Prievidza, Slovakia
E-mail:	robobanic@gmail.com
Phone:	+421 905 930 679

A.2 Division of buildings into objects and technical and technological facilities

- chalet
- private utility lines

A.3 List of input data

-location and altitude information
- protocol for determination of radon land index
- engineering-geological and hydrogeological assessment
- Territorial planning information (Pec pod Sněžkou, 04/2017)
- backgrounds from utilities administrators
- Builder requirements



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B – SUMMARY TECHNICAL REPORT

BACHELOR'S THESIS

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B.1 Description of the parcel

a) Characteristics of the territory and building plot, built-up and mom-built-up area, conformity of the proposed building with the character of the territory, existing utilization and building up of the territory

The subject of the solution is a new building – chalet, including paved areas, utility networks (water connections, sewerage and domestic LV lines). The building including paved areas, utilities (domestic water supply, sewerage and LV) and the driveway, will be realized on the land parcels No. 79/1 in cadastral area Pec pod Sněžkou (owned by the builder). The land is located on the northern edge of the village, in partially built-up area. The land is of irregular shape, its northern boundary is adjacent to the local road, and other building sites are on the east and west.

The land is free, there are no trees on it.

b) Data on compliance with a Territorial Decision or a Regulatory Plan or a Public Law replacing Territorial Decision or Territorial Approval.

This documentation also serves as documentation for the issue of a common consent.

c) Data about compliance with land-use planning documentation, in the case of building modifications subject to change of use of the building

The valid land-use planning policy as amended by No.1 or the principles of territorial development of Královohradecký region, does not address the intention.

According to the Territorial Plan, in the wording of its Amendments No. 1, land parcels No. 79/1 in cadaster of Pec pod Sněžkou is located partly in to be built-up area of BR - Areas of living in family houses (BR 60). In accordance with the conditions of use of these areas, a new family house is proposed.

For the BR area, Land-use planning conditions are not defined in the Territorial Plan.

The plan complies with the urban, architectural and aesthetic requirements of the use and spatial arrangement of the area with regard to the current nature of the area.

By implementing the project, the conditions in the area are not altered significantly, the plan does not require new demands on the public transport and technical infrastructure and the project is not subject to an environmental impact assessment.

d) Information on the decisions to grant exemption from general land use requirements

There were no exceptions to the construction. The general requirements for land use have been respected.

e) Information on whether and in what parts of the dossier the conditions of the binding opinions of the authorities concerned

The requirements of the government administration bodies concerned have been respected. The conditions are incorporated in a separate paragraph, which is part of the documentation.

f) List and conclusions of conducted surveys and analyzes - geological survey, hydrogeological survey, building historical survey, etc.

- location and altitude information
- protocol for determination of radon land index – middle radon risk
- engineering-geological and hydrogeological assessment; the area of interest is in a sloped terrain. Thy type of soil in the construction site is cambisol.

g) Protection of the territory according to other legal regulations

Land No. 79/1 in cad. Pec pod Sněžkou is located in a geologically stabilized area, not in a monument reservation or in a monument zone.

The construction will be carried out in the area without anticipated archaeological finds. There is no mining area in the settlement.

The area of interest does not fall within the territory of a national park or any protected landscape area. No small-scale, specially protected areas affect the area of interest. The site of interest does not include any element protected by Act No. 114/1992 Coll. The own interest site does not affect the supraregional or regional elements of the ÚSES or is part of the Natura 2000 network.

Construction of the land in question will result in permanent occupation of the agricultural land fund (ZPF).

The plan does not require the acquisition of land intended for forest functions (PUPFL).

h) Position relative to the flooded territory, undermined territory, etc.

The land is not located in the active flood neither in undermined territory.

i) Effects of the construction on surrounding buildings and land, protection of the environment, impact of the construction on drainage conditions in the territory

The construction will not adversely affect the surrounding land. Minimum stand-off distances are met. A fire-hazardous area does not interfere with adjacent the site. The building does not contain any technology that increases or reduces ambient air or groundwater temperatures. It does not contain any sources of technological noise or sources of hazardous radiation. The transient noise load during the construction works is generated using the construction machinery and will be minimized. Work will not be performed at night time.

Minimal air pollution results from combustion of wood in fireplace stoves. The realization of the project will take about 261.65 m2 of the total area of the land. The rainwater will be drained into sewerage. The sewage will be drained into the sewerage system, household waste will be stored in a container and taken into a dump.

Construction does not require an impact assessment pursuant to Act 100 / 2001Sb. (Law on Environmental Impact Assessment).

j) Requirements for decontamination, demolition, felling of trees

Under the proposed construction there will be no repairs or demolitions, the land is free.

The investment plan will not require intervention in existing stands. There are no trees in the area where the circumference of the trunk is greater than 80 cm at a height of 130 cm above the ground.

k) Requirements for the maximum temporary and permanent occupation of an agricultural land fund or land intended for the performance of forest functions

Plots of land No. 79/1 in cadastre Pec pod Sněžkou are the property of the builder, according to the valid land use plan, plot No. 79/1 is located in the to be built-up area of BR – Lands for living in family houses. The proposed plan will not use the agricultural land fund.

l) Territorial technical conditions - especially the possibility of connection to the existing transport and technical infrastructure, the possibility of barrier-free access to the newly proposed construction

There is concrete driveway next to the plot. The building will be connected with the road by new asphalt driveway.

There are existing utilities under the road (water, sewage and rainwater sewage, LV, gas). The building will be connected with new water, sewerage and low voltage power lines connections.

Decree No. 398/2009 Coll., On general requirements ensuring the barrier-free use of the building, does not apply because it is not a building under this paragraph.

m) Material and temporal links of the construction, conditional, induced, related investments

There are not.

n) A list of the plots according to the cadaster of the real estate on which the construction is placed and carried out

o) List of land according to the cadaster of real estate, on which a protection or safety zone will arise

No protection or safety zones will be built under construction.

B.2 Overall description of the building

B.2.1 Basic characteristics of the building and its usage

a) New construction or change of completed building; in the case of a change in the construction, the data on their current state, the conclusions of the construction technical, eventually the structural-historical survey and the results of the static assessment of the supporting structures

The subject of the solution is a new building including paved areas, utility networks (water connections, sewerage, gas pipes and LV lines).

b) Purpose of building use

The intended use of the proposed chalet is a building for rent.

c) Permanent or temporary construction

It is a permanent construction.

d) Information on decisions to grant exemption from technical requirements for construction works and technical requirements ensuring the barrier-free use of the construction

There were no exceptions to the construction site, the technical requirements for the buildings were respected. Decree No. 398/2009 Coll., On general requirements ensuring the barrier-free use of the building, does not apply because it is not a building under this paragraph.

e) Information on whether and in what parts of the dossier the conditions of the binding opinions of the authorities concerned are taken into account

Prior to construction, existing utilities will be set up. In the area of interest there is water, sewerage, gas, LV, and communication cables. When carrying out earth or other work that may endanger the distribution line in question, it is necessary to comply with Act 309/2006 Coll. and Government Regulation 591/2006 Coll., to take all measures to avoid damage to equipment, property or the health of persons. Any damage must be reported. The builder agrees to meet the conditions of the affected authorities and owners of the technical and transport infrastructure contained in their opinions and

statements. The conditions are incorporated in a separate paragraph, which is part of the documentation.

f) Protection of construction according to other legal regulations (cultural monument, etc.)

This is a new building that is not subject to other building protection legislation.

g) Proposed parameters of the construction - built-up area, built-up area, usable area, number of functional units and their size

The object of the solution is a new building of a family house including paved areas, utility networks (water connections, sewerage and domestic LN lines).
Construction - built-up area: 261.65 m2
Built-up area: 603,8 m3
Useful area: 390,16 m2
Number of functional units: 1
Number of users: 8

h) Basic balance of construction - media and materials needs and consumption, rainwater management, total product quantity and types of waste and emissions, energy class of buildings, etc.

-water

Average daily water demand	Qp = q x n = 96x8 =768 l / day	
Maximum daily water demand	Qm = Qp x kd =768 x 1,25 = 960 l / day	
Maximum hourly water demand	Qh = (Qm x Kh) / 12 = (960 x 1,8) / 24 = 72l/ h	
Annual water demand	Qr = Qp x 365 = 0,768 x 365 = 280,32 m³ / year	

-sewerage

Average daily drain	Qp = 1,55 m³ / day	
Maximum daily drain	Qm = 1,85 m³ / day	
Maximum hourly drain	Qh = 0.2725 m³ / h	
Annual drain	Qr = 395,8 m³ / year	

-rain water

Roof 270,5 m2	270,5 x 0,03 x 1	8,115 l/s
Annual drain of rain water		135,56 l/year

-gas

-class of energy efficiency

-waste

There will be thrash containers for trash separation in the garage

i) Basic building prerequisites - time data on construction realization, division into stages

Expected start date of construction: 06/2018
Expected completion date of construction: 09/2020
the construction will be carried out in one stage

j) Estimated construction cost

20 000 000 Kč

B.2.2 Overall urban and architectonical solution

a) Urbanism - spatial regulation, composition of spatial solution

The building of a chalet is designed in accordance with valid Territorial Planning Documents, land parcels No. 79/1 and cadastral area Pec pod Sněžkou.
The building has two floors, a basement and a garage, it is of a rectangular shape it has flat roof and shed roof in the middle part of the building if an inclination of 13°. The distance of the front facade from the street boundary of the plot is 9.00 m.
From an urban point of view, the construction with its rectangular ground plan and the shed roof will fit into the surrounding area.

b) Architectural design - composition of shape solution, material and color solutions

The architectural appearance of the building uses a combination of these materials: white plaster on the northern and southern façade, stone-like cladding, wooden cladding, concrete like painting on the protruding part of the building and a metal sheet roofing of grey color. These base materials will complement the windows of aluminium profiles of dark brown color and wooden elements. There will be pavement of concrete blocks and exterior concrete staircase. No fence will be installed.

B.2.3 Overall operational solution, production technology

The layout is based on investor requirements and land options. The main entrance to the building is at ground floor level, where there is a vestibule, corridor, toilet, living room , kitchen and cinema room. The layout and dimensions of individual rooms are evident from the drawing documentation.

B.2.4 Barrier-free use of the building

The object is not subject to the requirements. No 398/2009 Coll., on general requirements for the non-barrier use of buildings.

B.2.5 Safety in use of the building

The design documentation is prepared in accordance with the requirements of the regulations and relevant standards. After completion, the construction allows its safe use.

B.2.6 Basic Characteristics of Objects

a) Building, structural and material solutions

The object of the solution is a new building of a family house including paved areas, utility networks (water connections, sewerage and domestic LN lines).

Chalet

The building is of irregular rectangular shape. It has a basement and a garage in the basement level. It has two floors. The roof is flat with inclination of 2° and there is a shed roof in the middle part with inclination of 13°. The building is 9,188m tall at the highest point of the shed roof.

The building will be based on concrete foundation strips and reinforced concrete slab. Both peripheral and internal load-bearing walls are designed as an unpanel system for the installation of wooden structures, based on long-established so-called Canadian technology. Production and installation will be carried out by AVANTA SYSTEME spol. s.r.o.

Utility lines connections

Drinking water supply will be provided by a new water connection DN 25. On the land of the builder, 11m far from the building, is placed a plastic water meter shaft with a diameter of 1200mm. From the water meter shaft, a water supply pipe from HDPE 32x3.0 (DN 25) will be led behind the water meter assembly.

The sewage drainage will be provided by a new drainage connection DN 150.

Rain water will be soaked into the terrain.

The NN connection is terminated in the junction box at the boundary of the building plot. From here, the builder connects to the outdoor distribution via NN cable AYKY 4x16 or CYKY 4x10 The cable will be terminated in the cabinet with the RE meter meter (fuse before the 25 A meter). The CYKY 4Bx6 cable will be connected to the main switchgear of the building.

Paved areas

The driveway will be made of asphalt, the pavement and stairs will be made of concrete blocks

Fencing

There will be no fencing around the plot.

b) Mechanical resistance and stability.

The object is designed in accordance with ČSN EN 1990 Principles of designing structures, ČSN EN 1991 Structural load and ČSN EN 1995 Design of wooden constructions.

All used components meet the given exposure and correspond to the values of the utility, climatic and other loads considered in the design of the supporting structure. The construction is designed so that the load on it does not result

a) the collapse of the site or part thereof

Using the above standards ensures that the load condition is met

b) greater degree of unacceptable strain

Applying the above standards ensures that the condition of deformation is met

c) damage to parts of the structure as a result of greater strain on the load-bearing structure

There will be no unacceptable deformation during the construction of the building as a family house

d) Damage if the extent is disproportionate to the original cause

The object is designed for the conditions set forth in the above standards

There is no dynamic stress on the structure.

The supporting structure is designed from materials certified according to valid standards in the building industry. The stability of the structure is ensured by a rigid wooden frame system that safely transfers the effects of the load into the foundation of the object. The construction is resistant to all climatic influences and any load that can affect the structure during its lifetime.

The object is designed in accordance with ČSN 73 0035 / load of building structures / and ČSN 73 1701 / design of wooden constructions /. All used building components are suitable for given exposition.

There is no dynamic stress on the structure.

B.2.7 Basic characteristics of technical and technological equipment

a) Technical solution

There is no any unusual technological equipment to be installed. The main source of heat will be the electric heaters, the additional source will be the fireplace. The DHW will be prepared using an electric heater. The heat pump or air-conditioning system is not considered in the building.

b) List of technical and technological equipment

- electric heaters
- electric hot water heater

B.2.8 Fire Safety Solutions

The fire protection of the building will be dealt with in accordance with ČSN 730833 Buildings for housing and accommodation and other related standards of the "Fire Safety of the Building".

In accordance with this standard, it is ensured:

a) maintaining the load-bearing capacity and stability of the structure over a period of time - the required fire resistance of the materials and products used

b) limitation of the development and spread of fire and smoke in the construction site - by using of attested constructions and products

c) limitation of fire propagation to adjacent buildings - over-dimensioning of fire-exposed areas and examination of fire hazard area

d) enabling the evacuation of persons and animals - by escape into the open area

e) enable safe intervention of fire protection units - local roads allow the arrival of firefighting equipment

The fire - protection solution of the building is solved by a separate fire report, which is part of the project documentation for territorial and construction management. The fire area of the proposed object exceeds the boundary of the plot.

B.2.9 Energy Saving and Thermal Protection

• Thermal Engineering Criteria

The basic legal framework is created by Act No. 318/2012 Coll. amending Act No. 406/2000 Coll., on Energy Management, as amended. The specific properties of building structures are designed and evaluated in accordance with ČSN 730540-2 Thermal protection of buildings – Requirements

The structure is designed so as to meet the functional requirements for the thermal properties of structures and buildings according to the valid ČSN 73 0540-2.

• Energy performance of the building

According to the simple calculation of the heat transfer coefficient, the values of the building structures and the windows and doors of the upper structure are as following:

- exterior wall	U = 0.17 W / m2K
- roof	U = 0.13 W / m2K
- floor structure in 1st floor	U = 0.23 W / m2K
- outdoor windows (glass)	U = 1.000 W / m2K

In terms of thermal resistance, the standard conditions are met.
Energy class A

B.2.10 Hygiene requirements for buildings, requirements for work and communal environments

• ***Ventilation solution principles***

All the rooms for living have the necessary air exchange with regard to the number of people and the activity performed so that the microclimate conditions and the hygienic limits of chemicals and dust are respected. All rooms except are ventilated naturally by windows. Rooms for personal hygiene are ventilated by fans. Details are given in the individual parts of the submitted project documentation.

• ***Heating solutions***

The main heat source is electric heaters. An additional source of heat will be a fireplace with output up to approx. 10kW without connection to the hot water system, the flue gas outlet will be through a stainless steel chimney. Annual consumption of approx. 4m3 of wood.

• ***Lighting solutions***

Daily lighting and house lighting are in accordance with hygienic requirements. All living rooms have daylight in accordance with ČSN 73 0580.

• ***Water supply***

The building will be connected to the public water system.

• ***Waste water***

The building will be connected to the public sewage system.

• ***Wastes***

Communal waste will be collected in a separate waste containers located in the of the builder.

• ***The influence of the building on the surroundings***

Designed construction will not worsen conditions of sunshine and illumination for any of the objects in the nearby (affected) environment.

External noise construction will not produce and internal solutions and used building materials meet the requirements of the standards. Acoustic properties of basic structures of the upper structure:

- external wall Rw = 44dB
- inner load- bearing wall Rw = 37dB
- Window Rw = 32dB

The proposed new building meets hygienic health and hygiene conditions on the basis of the proposed building materials.

All materials proposed for construction do not pose a health or environmental risk.

B.2.11 Principles of building protection against negative effects of the external environment

a) Protection against the penetration of radon from the subsoil

The building will be insulated against ground moisture; a radon survey was carried out before the project was processed and, as a result, insulation against earth humidity is also adequately designed against radon (mean radon index).

b) Protection against stray currents

Protection of the building from sources of stray streams (eg electrified DC rail traction, local tram and trolleybus systems operated with DC, metro, etc.) is not addressed. The building is not located near to the sources of alien streams.

c) Protection against technical seismicity

Protection of the construction against the effects of technical seismicity (eg blasting, transport, industrial activities, pulsating water, etc.) is not addressed. There is no such seismic activity in the vicinity of the proposed building that would affect the design of the building structures.

(d) Protection against noise

Near to the new house of the family house there is no source of noise from the workshop or production. The heating of the family house will be electricity, will not be a heat pump.

Family house is located in the outskirts of the village. Near the building there is no significant road infrastructure. The nearby streets are only for arriving at the houses in the locality, so we do not consider them a source of above-limit noise.

Thus, it can be assumed that the hygienic limits equivalent to the sound pressure level A set out in Section 12 (1), (3) and Annex 3, Part A of the Government Decree No. 272/2011 Coll., On the Protection of Health from the Effects of Noise and vibrations will not be exceeded in the protected outdoor area of the family house.

e) Flood protection measures

The plot in question is located in a flood territory of the Rakovec watercourse. Flood protection measures will not be implemented.

f) Other effects - influence of undermining, occurrence of methane, etc.

There is a small risk of undermining or methane occurrence in the construction site.

B.3 Connection to technical infrastructure

a) Description of the transport solution including barrier-free accessibility and use of the building by persons with reduced mobility or orientation

A driveway to another building leads around the plot. The land of the family house will be connected to this road by a asphalt driveway.

Coll. No. 398/2009 Coll., On general requirements ensuring the barrier-free use of the building, does not apply because it is not a building under this paragraph.

b) Connection of the territory to the existing transport infrastructure

The land will be connected by a new driveway 7m wide and 9m long. The driveway continues to a garage. The rainwater from the entrance will not run into public communication. The paved area will be made of concrete pavement blocks.

c) Transport at rest

Two cars can be parked in the garage for two cars.

d) Pedestrian and bicycle paths

For pedestrian traffic, concrete blocks in the gravel layer will be lied on the building site.

B.5 Solution of vegetation and related terrestrial adjustments

a) Terrain adjustments

There will be excavation works – a pit for basement and foundations will be excavated. The excavated soil will be used as a backfill.

b) Used vegetation elements

Vegetation treatments around the building are not addressed by this documentation.

c) Biotechnical measures

The proposed nature of the construction does not require the implementation of biotechnical or biological measures in the area concerned.

B.6 Description of the environmental impact and its protection

a) Effects on the environment - air, noise, water, waste and soil

In normal operation, the project does not cause any significant adverse effects that should be eliminated or compensated. The prevention or elimination of adverse effects on the environment results, in particular, from strict compliance with applicable legal regulations and standards.

• ***Air***

The main heat source is electric heaters. An additional source of heat will be the solid fuel stoves with output up to approx. 10kW without connection to the hot water system, flue gas extraction will be through a complex system solution. Annual consumption of approx. 4m3 of wood.

•Noise

By implementing the project, the noise situation in the area will not change significantly. There are no technical and technological facilities installed in the building that are potential sources of noise. The unit is not installed in the unit. The noise emissions of the designed object into the outdoor area and its effect on the surrounding area will not exceed the values set by the hygienic regulations.

• Water

There is no watercourse in the immediate vicinity of the project, which would be classified as a significant watercourse. The actual area of construction is dry, there is no permanent or occasional surface flow. At present, the area concerned is an area where natural rainwater occurs.

Sewage sewage will be discharged through a sewerage connection to the public sewage system. It follows from the above that under standard operation the quality of surface and groundwater cannot be affected and these water resources will not be endangered by the proposed plan.

• Wastes

All waste will be treated in accordance with Act No. 185/2001 Coll. On Waste, as amended, and the related provisions. This Act regulates, among other things, the rules for the prevention and management of waste, while respecting environmental protection.

Construction has no negative impact on the environment. The new building of a family house will not generate any source of waste materials, ordinary household waste will be weighed by a specialized company on the basis of a contractual relationship.

• Soil

The construction will not result in permanent occupation of the agricultural land fund (ZPF). The plan does not require the acquisition of land intended for forest functions (PUPFL). In terms of soil contamination, the construction of the buildings is not expected to be negative.

b) Influence on nature and landscape - tree conservation, protection of memorable trees, protection of plants and animals, preservation of ecological functions and landscapes, etc.

Tree protection and protection of existing greenery:

The ČSN 83 9011 - Planting of plants, ČSN 83 9031 - Planting of the lawn, ČSN 83 9041 - Technical and biological safety measures, ČSN 83 9051 - Development and maintenance of plants and ČSN 83 9061 - Protection of trees, vegetation and vegetation areas in construction activities. Authorization to fell wood is defined in § 8 of Decree No. 114/1992 Coll.

Protection of memorable trees

Not required. They do not exist on the land.

Protection of plants and animals

During construction the conditions of Decree No. 114/1992 Coll. On Nature and Landscape Protection, as amended. The Decree lays down general rules for the protection of animals and plants - Part Two, Section 5, Section 6, Section 7. There are no significant plant and animal species in the area under consideration.

Preservation of ecological functions and links in the landscape

New buildings of the RD are not affected by ecological functions and boundaries in the landscape.

c) Impact on the Natura 2000 system of protected areas

The investor's area of interest is not located in a Natura 2000 protected area.

d) The way to take into account the conditions of the binding opinion of the Environmental Impact Assessment when it is the basis

A binding opinion on the environmental impact assessment is not a basis.

(e) In the case of projects falling under the Integrated Prevention Act, the basic parameters of the way to conclude on the best available techniques or the integrated permit, if issued

The proposed building does not fall under the Integrated Prevention Act.

f) Proposed protection and safety bands, extent of restrictions and conditions of protection under other legislation

The designation of new safety and security areas does not require the nature of the proposed construction. New protection zones are newly created along the routes of newly-built utility networks. The protection zones of electrical, gas and heating equipment are determined in accordance with Act No. 458/2000 Coll. Energetic law. The protection zones of water supply and sewerage systems are determined in accordance with Act No. 274/2001 Coll. About water supply and sewerage systems. The protection zones along the routes of telecommunications networks are laid down in Act No. 127/2005 Coll. On Telecommunications and the relevant Implementing Decree.

B.7 Protection of population

The construction of the family house fulfills the conditions of the municipal plan, ie it fulfills the basic requirements for the location and building solution of the building from the point of view of the protection of the population according to the design. No. 380/2002 Coll.

3. Conclusion

My work´s purpose was to design a stand-out building that is architectonically appealing and unique as well as functionally practical while meeting all the regulations.

For elaboration of this project I used all the necessary standards and design rules, regulations and technical sheets of manufacturers of elements and materials.

The project documentation was elaborated from an architectonic study, that I made previous semester and was regularly checked by the supervisor and consulted with architects and designers. A lot of significant changes were made in order to reach desired result. From structural point of view, the building is special for its complicated cantilevered parts which are all wooden based.

A thermal protection assessment is also part of the documentation, according of which, the building´s envelope is classified as A – very efficient. The building meets all the fire safety requirements.

4. List of used sources

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 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.
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Vyhláška č. 501/2006 Sb., o obecných požadavcích na výstavbu

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5. LIST OF USED ABBREVIATIONS AND SYMBOLS

Coll. collocation
ČSN česká státní norma = Czech state standard
FC fire compartment
LV list of ownership
S-JTSK jednotné trigonometrická sítě katastrální = uniform trigonometric cadastral network
VŠKP vysokoškolská kvalifikační práce = university qualification work
min minimal
max maximal
no. Number
par paragraph
RC reinforced concrete
mm milimeter
m meter
th. Thickness
S scale

6. List of annexes

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CALCULATION OF FOUNDATIONS
CALCULATION OF STAIRCASE

VYSOKÉ UČENÍ TECHNICKÉ V BRNĚ
FAKULTA STAVEBNÍ

POPISNÝ SOUBOR ZÁVĚREČNÉ PRÁCE

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Abstrakt práce Předmětem této bakalářské práce je návrh a projektová dokumentace, dvoupatrové chaty k pronájmu, s kapacitou 10 lůžek. Budova je situována v obci Pec pod Sněžkou v horské oblasti severního Česka. Z architektonického pohledu má budova za cíl vyčnívat její luxusním vzhledem popři využití přírodních materiálů jako dřevo, kámen a sklo, a tedy, respektující přírodní charakter prostředí. Z technického pohledu je budova navržena ze dřeva - Avanta systeme, s malým suterénem (technická místnost) a garáží pro 2 auta se stěnami z bednicích betonových tvarovek, rovnou střechou a pultovou střechou uprostřed objektu.

Abstrakt práce v anglickém jazyce

The subject of this bachelor´s thesis is a design and project documentation of a two-floor chalet for rent capable to accommodate up to 10 people. The building is located in a town of a mountain area in the north of Czechia called Pec pod Sněžkou. From architectural point of view the building is intended to stand out by its luxurious appearance whilst using natural materials and finishes such as wood, stone and glass, thus respecting natural character of the surrounding. From structural point of view the building is designed as a wooden house – Avanta systeme, with a small basement (boiler room) and garage for 2 cars with concrete blocks walls, flat roof and sloped roof above a middle part of the building.

Klíčová slova

Chata, dvoupatrový, dřevěná konstrukce, Avanta systeme, bednící tvarovky, rovná střecha, pultová střecha, luxusní vzhled

Klíčová slova v anglickém jazyce

Chalet, two-floor, wooden structure, Avanta systeme, concrete blocks, flat roof, shed roof, luxurious appearance