



TECHNICAL EXPERT REPORT ON THE MECHANICAL STRENGTH AND STABILITY OF THE SITE
STUDENT DORMITORY Gf+3F WITHIN TECHNICAL ENERGY COLLEGE IN VIEW OF THE THERMAL
INSULATION

Site address:

Sibiu municipality, str. Electricienilor, nr. 1

Work beneficiary:

Sibiu City Hall

Drafted by:

S.C. EUROENVIRONMENTAL CONSULTING SRL

Technical Expert
ENG. POP GAVRIL

March 2025

Technical Expert Report
for the site: *Student dormitory Gf+3F, Technical Energy College, Electricienilor street, no. 1, Sibiu Municipality, Sibiu county*

1.3 Summary Report

Work name	Technical expert report on the seismic assessment of the Student dormitory building Gf+3F, within Technical Energy College, Sibiu			
Expert report goal	Seismic assessment for thermal refurbishment of the building			
Expert report date	March 2025			
Technical expert	Eng. Gavril Pop	Badge	525 from 9.12.1993	
Adresa	Str. Electricienilor, no. 1, Sibiu Municipality			
Category of significance (GR 766/1997)				C
Category of significance and earthquake exposure (P 100-1)				III
Construction year	1965			
Building function	Student dormitory			
Total height above ground	12.35	Number of levels	B+Gf+3F	
Built area (sqm)	833	Developed area (sqm)	3.332	
Structure system	Structure with masonry walls			
Non-structural parts	Masonry partition walls, glazed closures with masonry parapet			
Seismic action (probability of exceedance in 50 years)	SLS	70%	ULS	20%
Ultimate Limit State Verification				
Evaluation methodology used (PI00-3)	1	<u>2</u>	3	
Level of fulfilling seismic composition conditions R ₁	60			
Structural damage level R ₂	72			
Level of seismic structural insurance , R ₃	67			
The seismic risk class in which the construction was classified , R _s	I	II	<u>III</u>	IV
Seismic risk class description	Building susceptible to moderate damage under the action of the design earthquake corresponding to the Ultimate Limit State, which may endanger the safety of the users			
Conclusions	The structure is classified into the seismic risk class R _s III, for which no intervention works are required for the strength structure. Repairs are required to the structural elements before cladding with thermal system			
The need for intervention works	Yes		<u>No</u>	
Seismic risk class before and after intervention works — thermal refurbishment, R _s	I	II	<u>III</u>	IV

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2 Evaluation report

2.1 Expert report purpose

The object of the technical expert report consists into the Student dormitory within the Technical Energy College, located in Electricienilor Street, no. 1, Sibiu County,

The purpose of this technical expert report is to examine the strength structure of the building intended as a gym hall within the Technical Energy College, located in the municipality of Sibiu, to assess its safety level, to approve the interventions to be carried out on the building so that its current level of safety is not affected by the thermal refurbishment works planned and to indicate any measures that must be taken into account for the current thermally refurbished building, so that it can be safely operated in accordance with the regulations in force.

According to the provisions of law no. 10 / 95 art. 18 amended in 2015, the intervention on an existing building can only be carried out on the basis of a technical expert report drawn up by a certified technical expert.

2.2 Technical regulations

For the assessment of seismic loads:

- P100-1/2013- Seismic design code-part 1. Design provisions for buildings
- - for the assessment of loads:
- - SR EN 1991-1-1. Actions of superstructures. Part 1-1: General actions- Specific weights, self-weights, useful loads for buildings.
- CR 1-1-3/2012- Loads due to snow action
- - CR 1-1-4/2012 Wind action
- - for the design of concrete and reinforced concrete structures:
- - SR EN 1992-1-1 Design of concrete structures
- CR2-1-1.1/2013 Design code for structures with structural reinforced concrete walls
- - CR6-2013. Design code for masonry structures.
- Normative NP 007/97. Design code for structures made of reinforced concrete frames.
- - for foundation works and foundation land:
- - Normative NP112-2013 regarding the design of foundation works.
- - STAS 3300/1,2-85. Foundation land. General calculation principles; calculation of land in case of direct foundation.
- - regarding the legislation in force:
- Law 10/95. Law on quality in construction with all subsequent amendments.
- - GR 767/97 regarding the classification into categories of significance.

2.3 Activities carried out for drafting the expert report

To prepare the expert report, a visual inspection in the field and a photo survey were carried out. It was also verified whether the dimensions of the construction and the structural elements correspond to those in the survey. The identification of the strength structure was carried out and compliance with the project was verified since the beneficiary holds the technical book of the building.

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2.4 Data that formed the basis of the technical expert report

2.4.1 Structural survey prepared by S.C. Allbizz S.R.L.

2.4.2. Miscellaneous drawings from the standard project prepared in 1967 by I.P.C.T. when constructing the building.

2.4.3. Visual examination of the building, as well as information received from the operating staff about the building.

2.4.4. Investigations carried out on site to identify the building's load-bearing structure.

2.4.5. The preliminary design documentation regarding the thermal refurbishment of the building shows the following works:

- removal of the current external plastering;
- repair of the vertical load-bearing elements;
- replacement of the joinery, including the glazed part with energy-efficient aluminum joinery with thermal barrier and sealing of the penetrations;
- cladding the perimeter walls on the outside with 15 cm thick basalt mineral wool boards, fixed to the walls by gluing and with bolts and dowels inserted into drilled holes;
- application of plasters reinforced with synthetic fiber meshes over the basalt mineral wool;
- on the terrace, the existing thermal insulation will be completed with 25 cm basalt mineral wool.
- the framework or the additional framework elements can be restored if there are affected strength elements
- photovoltaic panels will be installed on the roof of the highschool

2.5 Site characterization

2.5.1. Seismic zone classification. The building is located in the Municipality of Sibiu. The horizontal seismic load of existing buildings is determined according to the P100-1/2013 normative and Annex A of the P100-3/2019 code, based on art. 1 of order no. 2.834/13.12.2019 regarding the approval of the P100-3/2019 seismic design code. According to the P100-1/2013 seismic design code, the horizontal acceleration of the ground $a_g=0.20g$, the corner period of the site $T_c=0.7\text{sec.}$, the importance class of the existing construction is III. The value of the ground acceleration for the present building corresponds to an average recurrence period of 225 years.

2.5.2. Snow action zone classification. According to the design code CR1-1-3-2012 for the assessment of the snow action, the snow load $S_{0,k} = 1,5 \text{ KN/sqm}$, the exposure coefficient $c_e=0.8$ (total exposure),

2.5.3. The inclusion in the wind action area. According to the design code CR1-1-4-2012, the characteristic value of the reference wind pressure in the site is $q_{ref}= 0.6 \text{ KPa}$, the terrain category is III- with $z_0 =0.3$.

2.5.4. The geotechnical study was prepared on the occasion of this evaluation. 1 geotechnical drilling was carried out on the site which intercepted the following stratification:

0-0.70 m well-compacted fill

0.7-3.50 m light brown sandy clay, plastic gravel, consistency

3.50-6.00 m clayey sand with gravel, medium compaction

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The building does not show any deformations that would indicate exceeding the bearing capacity of the ground, and the refurbishment interventions bring an insignificant gravitational load. The geotechnical study shows a conventional design pressure of 270 kPa.

2.6. Building description

The student dormitory building of the Technical College of Energy, located in Electricienilor Street, no. 1, Sibiu City, consists into a single section with the height regime B+Gf+3F with partial basement and technical channel located under the median longitudinal corridor. The building was designed by adapting an I.P.C.T. type project from 1965 which was intended as a dormitory for non-family students with 300 places and was built in the immediate following period.

The dormitory is made of a single section, which is included in a rectangle with dimensions in plan 54.3x15.10m. The access area that protrudes 1.20 m outside the mentioned rectangle is an exception. The dormitory is a regular construction with walls that delimit rooms with a width of 3.6 m between axes. Along the length, the dormitory is provided with 15 modules of 3.6 m usually hosting one room. In the sanitary area developed on the width of three modules and in the main staircase area developed on the width of two modules, a transverse wall lacks its rigidity and is replaced by a reinforced concrete frame. The building is divided into 3 openings 5.40+2+5.40 m, representing 2 rooms and a median hall that is developed on the entire length of the construction. The height regime of the dormitory is +12.37 m from the elevation +0.00 m, represented by the floor elevation. The building is equipped with two stairwells. The main staircase together with the entrance hall occupies two 3.6m modules. In the main staircase area, the building is provided with a balcony/loggia on all levels. The secondary staircase in two ramps has a width of 2.5m, the remaining approx. 1m of the width of a 3.6m module is intended for a balcony/loggia arranged on the side entrance of the building. Subsequently, over the terrace roof with waterproofing membrane, an additional wooden gable roof was built with ceramic tile covering and a ridge height of 5.2 m. Four rows of braced props placed on the walls of the longitudinal corridor and on the transverse walls at 3.6 m intervals, support wooden wedges with a section of 17x18 cm on which the rafters with a section of 9x11 cm at 60 cm intervals rest. Around the perimeter of the terrace roof, a concrete attic was provided on which wooden rafter beams were laid to support the rafters. The rafter beams are anchored to the concrete attic. A row of vertical metal props were installed to support the roof slab in the area of the balconies right by the entrance. The elevation +0.00 of the fireplace is about 55 cm above the natural ground elevation. The basement is arranged under the heating plant which is arranged at one end of the building and occupies two modules (rooms) with a width of 3.6m. The technical channel arranged under the longitudinal corridor contains the installation pipes to which the installation columns in the dormitory rooms are connected.

The strength structure of the dormitory, above the elevation +0.00 m, consists into:

- Vertical elements: masonry strength walls with a thickness of 25 cm for the interior walls and 30 cm for the perimeter walls.
- Horizontal elements: Floor made of belts, beams and prefabricated strip floors in the room area, monolithic reinforced concrete slab in the hallway area.

The construction infrastructure is as follows::

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- Continuous plain concrete foundations provided in each axis of the construction. For the internal transverse walls the foundation bases are 80 cm thick, for the longitudinal walls they are 70 cm thick, and for the perimeter walls 50 cm. The foundations are made of plain concrete bases B50 and the elevations are made of B100 with a thickness of 35 cm..

2.6. QUALITATIVE EVALUATION OF THE STUDENT DORMITORY BUILDING

The Gf+3E building of the student dormitory was designed in 1965 and was built in the immediate following period. The building has a structural system designed and dimensioned based on the seismic norm P13/1963, the first Romanian seismic norm that has been consistently improved over the years.

The strength structure of the student dormitory is designed as a building which lateral rigidity is ensured by an orthogonal system of load-bearing masonry walls that collaborate with a limited system of frames. The masonry diaphragms have sufficient thickness, and have shear sections appropriate for the height regime of the building and for the seismic intensity of the site. The walls are arranged in two orthogonal directions. The perimeter strength walls are 30 cm thick and are made of G.V.P. bricks. 63x140x290 mm brand 75. The longitudinal and transverse inner walls are made of pressed solid brick with a thickness of 25 cm brand 75. The mortar is brand 25 on the ground floor and brand 10 on the other floors.

The strength structure is regular, consisting of longitudinal masonry walls that border the hall (corridor) and transverse masonry walls provided at a distance of 3.6 m that border the rooms. However, there are some exceptions to this regular compartmentalization.

The access is through an area organized in 3 3.6 m bays in which a windfang, stairwell and an office were provided. In another 3 bays, the sanitary groups are organized, consisting of toilets, washbasins and showers, each arranged in a bay. On the end facing the high school, a dryer and a heating plant were provided in the last 2 rooms. Also in the last room, a second stairwell was provided that ensures vertical circulation.

In the premises in front of the access, reinforced concrete frames were provided made of pillars of different sizes and beams with a width of 25 cm and a height of 44 or 55 cm. On this area the building's staircase is also provided. A loggia was created above the entrance, in the form of a reinforced concrete floor supported on 3 sides.

The floor of the building is made of narrow strips with gaps 60 cm wide and 14 cm high. The exception is the central corridor area, the stairwell area and the sanitary group area where the floor is made of monolithic reinforced concrete.

Compared to the initial project, a light frame was created with a wooden structure and ceramic tile covering. Also on the left side entrance, the space that was initially provided as a terrace was closed, resulting in the current room of the heating plant. The closure is made of masonry.

The building is provided with a partial technical basement and technical channel located under the median longitudinal corridor. This could not be visited because it was flooded.

The technical condition of the building is appropriate with some exceptions as follows:

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- the technical basement of the building is flooded.
- the exterior plasters have deteriorated, crumbling and partially exfoliated areas;
- the joinery has some leaks;
- the sidewalk is detached from the wall and has a reverse slope on certain sections, and on certain sections the sidewalk is missing;
- there are some traces of infiltration at the base level, due to the lack of a sealing detail of the sidewalk and the drains that have leaks.
- the reinforced concrete slab of the loggia placed over the access hall was examined does not show any degradation of the resistance structure.

The brick masonry construction system analyzed in light of the current norms, namely the "Design Code for Masonry Structures", indicative CR 6-2013,

"Seismic Design Code - Part I - Design Provisions for Buildings. Designing Structures Foundations in Constructions", indicative P100-1/2013 and "Seismic Design Code - Part III - Provisions for the Seismic Assessment of Existing Buildings, indicative P100-3/2019, the following is found:

- the masonry is unreinforced (ZNA), without cores at corners, intersections, and branchings of the walls, which ensure the spatial character of the masonry structure according to CR 6-2013;
- the distances between the transverse load-bearing walls and between the structural bracing walls are below 5.0 m. The condition is met, being equal to the limit imposed by the code.
- the level height of the building of 3.00 m is within the limit allowed by the norms for unreinforced masonry structures (ZNA) respectively $h_{etaj} < 3.00$ m;
- in case of unreinforced masonry buildings (ZNA) in Sibiu $a_g = 0.2$ g (average recurrence interval 225 years) the number of floors allowed for ZNA is $P + 1E$ c.f. P100-1/2013. The building that makes the scope of the expert report does not comply with the requirement.
- The building does not comply with the conditions for placing reinforced concrete columns.
- The intermediate masonry spans must have a length of > 1 m and the end ones > 1.20 m. Condition met the intermediate masonry spans, between the windows of 1.3 m and the end ones only partially comply with the condition.
- the density of the longitudinal structural bracing walls is $p = 4.3\% < 5.5\%$ does not comply with the requirements P100/1-2013 for unreinforced masonry structures (ZNA)
- in the transverse direction the density of the structural walls is $p = 6.15\% > 5.5\%$. It is also observed that the percentages of masonry in the transverse direction are higher than those in the longitudinal direction.
- has structural simplicity — a clear, direct and uninterrupted path of seismic forces is ensured to the foundation ground.
- has structural redundancy — the failure of a single structural element does not lead to the loss of stability of the structure;
- structural regularity in plan is ensured — the construction has a compact shape, and is symmetrical in plan in relation to two orthogonal directions, in terms of the distribution of lateral stiffness, strength capacities and masses;
- vertical regularity — the structural system is monotonous vertically with the same compartmentalization at all levels;
- the stiffness and translation resistance in the two orthogonal directions is approximately equal;

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rigidity and torsional strength is partially ensured by masonry diaphragms arranged on the perimeter of the building in each direction.

structural simplicity — a clear, direct and uninterrupted path of seismic forces is ensured to the foundation ground;

the prefabricated concrete slabs have sufficient rigidity and are correctly connected to the vertical structural elements to play the role of horizontal diaphragm;

2.7. Knowledge level

The basis for establishing the level of knowledge KL2 — normal knowledge according to the P100-3/2019 normative document of the existing construction were:

- the geometry of the structure, the overall configuration of the structure and the dimensions of the structural elements are known from the survey and on-site surveys and disparate plans from other surveys;
- the composition of the structural elements, including the quantity and detailing of the reinforcement in the reinforced concrete elements are known based on the plans from the initial project and details were designed based on the usual practice during the construction period;
- the materials used in the structure, respectively the mechanical properties of the concrete and steel materials, are known based on the initial project.

Depending on the quantity and quality of the information obtained, the confidence factor CF=1.2 is adopted, as shown in point 4.3. of the P100-3/2019 code.

2.8. Evaluation methodology

Given that the beneficiary owns the initial projects in which basis the building was built, it was possible to check the strength of the structure in light of the regulations in force today based on the initial project, the surveys, direct and laboratory investigations through which the necessary information was obtained. The strength structure of the building was designed for loads from its own weight, useful loads related to the school destination, climatic loads from wind and snow and seismic action.

The student dormitory building has the structural system designed and dimensioned based on the seismic norm P13/1963, with masonry walls working with reinforced concrete frames.

According to the norm P100—3/ 2019, the representation of the seismic action for the evaluation of structures is carried out according to the provisions of P 100-1 and annex A to P100-3, and for the evaluation by calculation using the level 2 methodology, the global seismic coefficient is determined as follows:

$$c = \gamma \times a_g \times \beta_0 \times \lambda \times \eta / q$$

$\gamma = 1$ - constructions of class III importance;

$a_g=0.20$ g for IMR = 225 years ;

$T = k_T \times H^{3/4} = 0.045 \times 7^{3/4} = 0.24$ sec ;

$k_T = 0,045$ for reinforced concrete and masonry wall structures;

$\beta_0=2,5$;

$\gamma = 0.85$ building with more than one floor and one opening ;

$q = 1,50$ – confined masonry structures with regularity in plan and vertically collaborating with reinforced concrete frames built between 1964-1977, acc.to P100-3, annex D, pt. D.3.3.1.6 and annex B pt. 4.2.1.

$\eta = 0.88$ according to P100-3/2013 for the critical damping fraction of 8%

Constructions of class III significance with future operating period more than 40 years. One makes a simplified calculation through level 1 methodology.

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- built area $S = 815 \text{ sqm}$;
- building weight $W = 3393 \text{ to.}$;
- longitudinal walls $A_{pl} = 34.61 \text{ sqm}$;
- transversal walls $A_{pt} = 50.14 \text{ sqm}$
- seismic coefficient $c = 1.2 \times 0,2 \times 2,5 / 1.5 \times 0.85 \times 0.88 = 0.249$;
- basic cutting force $F_b = c \times G = 0.249 \times 3993 = 995.7 \text{ to.}$
- Then the average compression unit effort $\bar{\sigma}_0$ is calculated:
- $\bar{\sigma}_0 = G / (A_{pl} + A_{pt}) = 47 \text{ to/sqm}$

Admissible value of the average tangential unit stress

$$V_{adm} = 1,33 \text{ Tk} / (CF \gamma_m) \sqrt{1 + \bar{\sigma}_0 CF \gamma_m} / (2 \text{ Tk}) = 19.87 \text{ tonf/sqm}$$

where :

- $\text{Tk} = 0,2 \text{ N/mm}^2$ for masonry with cement mortar.
- $\gamma_m = 2,3$, for current masonry (after 1950)

The verification is carried out in the longitudinal direction considered weak due to the smaller area of masonry walls.

$$F_{head, walls} = A_{pl} \times v_{adm} = 34.61 \text{ sqm} \times 19.87 = 687.83 \text{ to.}$$

the ratio between seismic capacity and structural requirement

$$R^3 = F_{head} / F_b = 687.83 / 995.7 = 0.69$$

The evaluation by the level 1 methodology shows a minimum structural strength level $R^3 = 69\%$. This is located between 65% and 90%, which classifies the construction into the seismic risk class R_{sIII} with the recommendation that no consolidation measures are necessary.

The calculation is then carried out by the level 2 methodology. The seismic force is determined similarly to the previous calculation but considering, according to P100-1/2013, a behavior factor increased by 1.9, which takes into account the regularity of the building and the possibility of redistribution of efforts. Taking into account the class 75 specified for bricks

$$f_m = 2.35 \times 1.30 = 3.05 \text{ MPa} \text{ and } f_{vk0} = 0.20 \text{ MPa}$$

Unit design strength to compression: $f_d = 3.05 / 1.2 = 2.54 \text{ MPa}$.

Unit characteristic strength to shear $f_{vd} = f_{vm} / (\gamma_M \times CF)$. The average value of the horizontal joint shear resistance capacity f_{vm} is determined by the relation

$$f_{vm} = 1.33 \times (f_{vk0} + 0.4 \bar{\sigma}_d) / (\gamma_M \times CF)$$

where $\bar{\sigma}_d$ represents the design value of the normal unit stresses and γ_M represents a partial safety coefficient, considered 2.3 for masonry built after the 1950s.

Unit design strength to failure on an inclined section (tear strength)

$$f_{td} = 0.04 f_m / (\gamma_M \times CF)$$

For each wall, the design value of the shear force associated with the failure by eccentric compression of an unreinforced masonry wall is evaluated: The shear forces associated with the failure by eccentric compression were calculated for both directions:

$$V_{f,1} = 2 * \lambda_p (1 - 1.15 v_d)$$

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$\lambda_p = \frac{H_p}{l_w}$ is the wall form factor

H_p is the wall height

l_w is the wall length

$\sigma_d = \frac{N_d}{t \cdot l_w}$ is the standardized unit stress calculated as ratio between the unit stress

perpendicular on the calculated risk and the unit effort of the masonry design on compression

One also calculates the design values of the breaking cutting forces

$$V_{f2} = \min(V_{f21}, V_{f22})$$

Strength to breaking cutting forces by horizontal joint sliding :

$$V_{f21} = \frac{1.5}{CF \cdot \gamma_M} \left(f_{vk0} \cdot \frac{a_d}{l_c} + 0.4 \sigma_d \right) \cdot t \cdot l_c$$

$$l_c = 1.5 - 3M_d/N_d \text{ - length of the section compressed area}$$

M_d – design bending moment

N_d – design axial force

$l_{ad} = 2l_c - l_w$ length on which the adhesion is active

If $l_{ad} \leq 0, V_{f21} = \frac{0.53N_d}{CF \cdot \gamma_M}$

The value of the breaking cutting forces by diagonal cracking is calculated by using the formula:

$$V_{f22} = \frac{t \cdot l_w \cdot f_{td}}{b} \cdot \sqrt{1 + \frac{\sigma_0}{f_{td}}}$$

$1 \leq b = \lambda_p \leq 1.5$

b coefficient with the following values:

Below, as a table, we present the stresses obtained from calculation and the capacities for each pillar.

lw(m)	t(m)	V[kN]	M[kn m]	Vf1[kN]	Vf21[kN]	Vf2,2[kN]	Vrd[kN]
0.9	0.3	39.93	226.99	60.09	40.73	30.19	30.19
1.4	0.3	86.52	491.83	145.39	46.00	65.74	46.00
1.4	0.3	86.52	491.83	145.39	46.00	65.74	46.00
1.4	0.3	86.52	491.83	145.39	46.00	65.74	46.00
1.4	0.3	86.52	491.83	145.39	46.00	65.74	46.00
1.4	0.3	86.52	491.83	145.39	46.00	65.74	46.00
1.9	0.3	134.43	764.14	267.79	62.43	95.59	62.43
1.9	0.3	134.43	764.14	267.79	62.43	95.59	62.43
1.5	0.3	96.13	546.45	166.90	49.29	75.47	49.29
1.4	0.3	86.52	491.83	145.39	46.00	65.74	46.00
1.4	0.3	86.52	491.83	145.39	46.00	65.74	46.00
1.4	0.3	86.52	491.83	145.39	46.00	65.74	46.00
1.4	0.3	86.52	491.83	145.39	46.00	65.74	46.00
1.4	0.3	86.52	491.83	145.39	46.00	65.74	46.00
4.5	0.3	120.73	686.24	375.53	261.71	226.41	226.41
1.91	0.25	125.41	712.88	225.51	52.30	80.08	52.30
1.8	0.25	115.71	657.70	200.28	49.29	75.47	49.29
2.73	0.25	196.35	1116.10	460.71	74.75	114.46	74.75
2.73	0.25	196.35	1116.10	460.71	74.75	114.46	74.75

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2.73	0.25	196.35	1116.10	460.71	74.75	114.46	74.75
2.73	0.25	196.35	1116.10	460.71	74.75	114.46	74.75
2.73	0.25	196.35	1116.10	460.71	74.75	114.46	74.75
6.5	0.25	200.37	1138.92	652.93	324.77	272.53	272.53
6.5	0.25	200.37	1138.92	652.93	324.77	272.53	272.53
2.73	0.25	196.35	1116.10	460.71	74.75	114.46	74.75
2.73	0.25	196.35	1116.10	460.71	74.75	114.46	74.75
2.73	0.25	196.35	1116.10	460.71	74.75	114.46	74.75
2.73	0.25	196.35	1116.10	460.71	74.75	114.46	74.75
1.5	0.25	91.92	522.48	139.09	41.07	62.89	41.07
1.5	0.25	91.92	522.48	139.09	41.07	62.89	41.07
2.73	0.25	202.66	1151.96	460.71	74.75	114.46	74.75
2.73	0.25	202.66	1151.96	460.71	74.75	114.46	74.75
2.11	0.25	147.54	838.66	275.21	57.78	88.47	57.78
6.5	0.25	206.80	1175.51	652.93	318.28	272.53	272.53
2.73	0.25	202.66	1151.96	460.71	74.75	114.46	74.75
2.73	0.25	202.66	1151.96	460.71	74.75	114.46	74.75
2.73	0.25	202.66	1151.96	460.71	74.75	114.46	74.75
2.73	0.25	202.66	1151.96	460.71	74.75	114.46	74.75
2.73	0.25	202.66	1151.96	460.71	74.75	114.46	74.75
2.73	0.25	202.66	1151.96	460.71	74.75	114.46	74.75
2.73	0.25	202.66	1151.96	460.71	74.75	114.46	74.75
2.73	0.25	202.66	1151.96	460.71	74.75	114.46	74.75
4.56	0.25	118.12	671.42	321.35	195.07	191.19	191.19
0.66	0.25	21.76	123.68	26.93	18.07	18.45	18.07
0.9	0.3	50.32	286.02	60.09	29.57	30.19	29.57
1.4	0.3	109.03	619.73	145.39	46.00	65.74	46.00
1.4	0.3	109.03	619.73	145.39	46.00	65.74	46.00
0.95	0.3	55.87	317.55	66.95	31.22	31.86	31.22
1.36	0.3	104.19	592.24	137.20	44.69	62.04	44.69
1.4	0.3	109.03	619.73	145.39	46.00	65.74	46.00
1.4	0.3	109.03	619.73	145.39	46.00	65.74	46.00
1.4	0.3	109.03	619.73	145.39	46.00	65.74	46.00
1.4	0.3	109.03	619.73	145.39	46.00	65.74	46.00
1.4	0.3	109.03	619.73	145.39	46.00	65.74	46.00
1.4	0.3	109.03	619.73	145.39	46.00	65.74	46.00
1.4	0.3	109.03	619.73	145.39	46.00	65.74	46.00
1.4	0.3	109.03	619.73	145.39	46.00	65.74	46.00
4.57	0.3	154.11	875.97	387.31	208.35	229.93	208.35

5.87	0.25	158.55	788.50	691.47	1065.00	517.45	240.11	240.11
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Technical Expert Report
for the site: *Student dormitory Gf+3F, Technical Energy College, Electricienilor street, no. 1, Sibiu Municipality, Sibiu county*

lw(m)	t(m)	V[kN] e	M[kn m] e	Nd [kN]	Vf1[kN]	Vf21[kN]	Vf2,2[kN]	Vrd
4.6	0.30	154.30	877.07	650.24	784.82	214.18	231.44	214.18
2.0	0.30	408.12	2319.86	282.71	148.36	65.72	67.08	65.72
1.30	0.30	1146.55	6517.23	183.76	62.68	42.72	43.60	42.72
6.77	0.25	84.55	480.62	797.48	1416.61	420.84	283.85	283.85
5.87	0.25	138.33	786.30	691.47	1065.00	317.43	246.11	246.11
6.77	0.25	104.00	591.14	797.48	1416.61	412.45	283.85	283.85
6.77	0.25	123.17	700.14	797.48	1416.61	403.26	283.85	283.85
6.77	0.25	123.17	700.14	797.48	1416.61	403.26	283.85	283.85
6.77	0.25	142.35	809.14	797.48	1416.61	393.01	283.85	283.85
6.77	0.25	142.35	809.14	797.48	1416.61	393.01	283.85	283.85
6.77	0.25	161.53	918.14	797.48	1416.61	381.51	283.85	283.85
6.77	0.25	161.53	918.14	797.48	1416.61	381.51	283.85	283.85
6.77	0.25	180.70	1027.15	797.48	1416.61	368.51	283.85	283.85
6.77	0.25	180.70	1027.15	797.48	1416.61	368.51	283.85	283.85
6.77	0.25	199.88	1136.15	797.48	1416.61	353.69	283.85	283.85
6.77	0.25	199.88	1136.15	797.48	1416.61	353.69	283.85	283.85
6.77	0.25	219.05	1245.15	797.48	1416.61	336.65	283.85	283.85
6.77	0.25	205.47	1167.94	797.48	1416.61	348.97	283.85	283.85
6.77	0.25	205.47	1167.94	797.48	1416.61	348.97	283.85	283.85
5.87	0.25	298.82	1698.53	691.47	1065.00	160.74	246.11	160.74
6.77	0.25	224.65	1276.94	797.48	1416.61	331.19	283.85	283.85
5.87	0.25	324.32	1843.52	691.47	1065.00	160.74	246.11	160.74
6.77	0.25	243.82	1385.95	797.48	1416.61	310.46	283.85	283.85
6.77	0.25	263.00	1494.95	797.48	1416.61	285.98	283.85	283.85
6.77	0.25	263.00	1494.95	797.48	1416.61	285.98	283.85	283.85
6.77	0.25	282.18	1603.95	797.48	1416.61	256.63	283.85	256.63
6.77	0.25	301.35	1712.95	797.48	1416.61	220.79	283.85	220.79
6.77	0.25	320.53	1821.96	797.48	1416.61	185.38	283.85	185.38
6.77	0.25	320.53	1821.96	797.48	1416.61	185.38	283.85	185.38
7.00	0.30	317.75	1806.15	989.49	1817.40	379.52	352.19	352.19
7.00	0.30	317.75	1806.15	989.49	1817.40	379.52	352.19	352.19

A superunitary insurance index is obtained in the transverse direction $R3=1.01$, and in the longitudinal direction an insurance index $R3=0.55$.

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2.9 The level of fulfilling the terms for seismic structure, R

According to the order of the Minister of Development, Public Works and Administration No. 3.230/2022 on the approval of the technical regulation "Guide for carrying out integrated intervention works in multi-family residential buildings and public buildings, indicative RTC 1 — 2022": In order to establish the decision on carrying out intervention works to increase the energy performance of buildings through the multi-annual national program on increasing the energy performance of apartment buildings or through other programs, such as the National Recovery and Resilience Program - Component 5 — Renovation Wave or Regional Operational Programs, a technical expert report is carried out from the point of view of assuring the essential requirement "mechanical strength and stability", following the qualitative method, in accordance with the provisions of Government Emergency Ordinance no. 18/2009, on increasing the energy performance of apartment buildings, as amended and completed. In the case of applying the qualitative assessment procedure of the seismic risk class, the level of fulfilling the seismic structure conditions and the level of structural damage is determined according to the provisions of the P100-3 design code and is multiplied by factor 0.8 for buildings built between 1963 and 1977.

Establishing the seismic risk class of the building with height regime Gf is made in accordance with P100-3/2019 based on 3 categories of conditions that make the scope of investigations and analyses carried out within the assessment as follows:

The level of fulfilling the seismic design conditions marked with R1 for the level 2 methodology is established based on the criteria in Annex B, point B.3.1.2., of the code P100-3/2019

1. Quality of the structural system:

- 2 - assessment criteria: the efficiency of the spatial cooperation of the structural elements, which depends on the type and quality of the connections between the walls in orthogonal directions and the connections between the walls and the floors; the existence of sufficient and approximately equal masonry areas in the two directions;

In this case, the efficiency of the spatial cooperation of the structural elements and the quality of the connections between the walls in the directions is ensured by the masonry weave. The percentages of walls are not approximately equal in the two directions. The structure does not meet all the construction measures specified by the standards in force.

- moderate non-compliance 6 points.

2. Masonry quality:

- assessment criteria: the quality of the elements, the joints homogeneity, the joints regularity, the level of filling with mortar, the existence of areas weakened by slots and/or niches, etc.;

- indicative criterion for maximum score: quality of materials and execution according to the regulations in force.

It is considered that the initial masonry is depreciated due to the long period of operation.

- moderate non-compliance 4 points.

3. Type of floors:

- assessment criteria: rigidity of the floors in the horizontal plane and efficiency of the connections with the walls (ability to ensure compatibility of structural wall deformations and to prevent the walls from overturning due to seismic forces perpendicular to the plan);

- the indicative criterion for the maximum score: complete monolithic reinforced concrete floors at all levels, without gaps that significantly weaken their resistance and rigidity in horizontal plan.

- minor non-compliance 8 points

4. Plan configuration:

- assessment criteria: compactness and geometric and structural symmetry in plan, expressed by the ratio between the lengths of the sides and by the dimensions of the setbacks in plan. In this case, there is symmetry in the plan, the transverse and longitudinal walls being regularly arranged in the plan. Also, the percentage of walls on the two directions of the structure is approximately equal.

- the indicative criterion for the maximum score: the provisions of P 100-1/2006.

- minor non-compliance 8 points.

5. Elevation configuration:

- assessment criteria: geometric and structural uniformity in elevation expressed by the absence/existence of successive floor setbacks, the existence of protrusions at the last level, discontinuities created by increasing the area of wall voids at the ground floor/at an intermediate level;

- indicative criterion for maximum score: provisions P 100-1/2006.

- minor non-compliance 8 points.

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6. Distances between walls:

- assessment criteria: distances between structural walls, on each of the main directions of the building;

- indicative criterion for maximum score: structural system with hollow walls (honeycomb) defined according to CR 6-2006.

A moderate reduction is considered due to the large distance between walls

- moderate non-compliance 5 points.

7. Elements that give lateral thrusts:

- assessment criteria: existence of arches, columns, domes, trusses, with/without elements that take over/limit the effects of thrusts;

- criterion met 10 points. (maximum score)

8. Type of foundation ground and foundations:

- assessment criteria: type of the foundation ground (normal/difficult), capacity of foundations to take over and transmit vertical loads to the ground, efforts resulting from differential settlements and earthquake action;

- indicative criterion for maximum score: normal foundation ground, continuous reinforced concrete foundations.

- minor non-fulfilment 8 points.

9. Possible interactions with adjacent buildings:

- assessment criteria: existence/absence of the risk of collision with adjacent buildings (isolated building, building with neighbors on 1, 2, 3 sides), the heights of neighboring buildings, the existence of the risk of falling of some components of neighboring buildings. In this case, the building is independent.

- moderate non-compliance 5 points. There are joints between sections but in the case of a major earthquake this is not large enough to ensure the independent behavior of the structures.

- criterion met 10 points. (maximum score)

10. Non-structural elements:

- assessment criteria: the existence of major masonry elements (sills, pediments, tympanas}, heavy cladding, other important decorative elements that pose a risk of collapse;

- indicative criterion for the maximum score: the absence of these elements or ensuring their stability according to the provisions of P 100-1/2013.

- minor non-fulfilment criterion 8 points (maximum score)

In conclusion, the level of fulfillment of the seismic composition conditions is assessed

$R = 75 * 0.8 = 60$ points.

According to chapter 8.1.1. of code P100-3/2019, for buildings with a level of fulfillment of the seismic composition conditions, R1 between 60-89, the buildings can be classified into the seismic risk class RsIII.

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2.10 Level of structural damage, R2

The level of structural damage, denoted by R2, which expresses the part of structural degradation produced by seismic action and other causes, is established based on the criteria in Annex D, page. D.3. of the P100-3/2019 code. It is found that the masonry walls have minor cracks, but there is an extensive area where the plaster is depreciated and the masonry has been subjected to the action of environmental factors. It is assessed that both vertical and horizontal elements are moderately affected on an area of max 1/3 of the entire area of the building. In conclusion, the score for the vertical elements $A_h=25$ points, respectively $A_v=65$ for the horizontal elements. In conclusion, for the degree of structural damage $R_2=90*0.8=72$ points.

According to chapter 8.1.1. from code P100-3/2019, for buildings with a degree of fulfillment of the seismic composition conditions, R2 between 70-90, the buildings can be classified into seismic risk class RsIII.

2.11 Evaluation summary

The construction subject to the expert report was assessed in accordance with the level 1 methodology.

Following the qualitative assessment of the level of fulfilling the seismic structure conditions R1, it obtained a total of 60 pts., falling into the seismic risk class RsIII.

Following the qualitative assessment of the level of structural damage R2, the structure obtained 72 pts., corresponding to the seismic risk class RsIII.

The assessment using the level 1 methodology indicates a minimum structural insurance level $R_3=69\%$ and $R_3=101\%$ on transversal direction and $R_3=55\%$ on longitudinal direction by level 2 methodology. The insurance level is between 65% and 90%, which places the construction into the seismic risk class RsIII. Exception makes the longitudinal direction of the construction.

Taking into account the values of the three indicators R1, R2 and R3, one considers, based on the code P100-3/2019, for the building of Gf- Gym Hall, located within the Technical Energy College, str. Electricienilor, no. 1, Sibiu Mun., Sibiu county, the seismic risk class RsIII. Seismic risk class Rs III includes buildings susceptible to moderate damage to the design earthquake action corresponding to the Ultimate Limit State, which may endanger the safety of users.

2.12 Proposals for intervention

The structure is classified into seismic risk class RsIII, for which no intervention works are requested for the strength structure.

The thermal refurbishment works are described below:

- repair of balcony parapets where applicable
- joinery replacement, including the glazed part and sealing of penetrations
- cladding of the perimeter walls on the outside with 15 cm thick mineral wool, fixed to the walls by gluing and with bolts and dowels inserted into drilled holes according to the manufacturers' instructions;
- application of plasters reinforced with synthetic fiber mesh over the mineral wool;
- a 25 cm thick wool thermal insulation will be installed over the reinforced concrete floor on the last level;

Cladding the building with mineral wool boards protected by plaster does not bring significant additional loads and does not affect the integrity of the structural elements. Before enclosing the building, any defects in the structural elements will be repaired with epoxy mortars (chips, exposed reinforcement, cracks, monolithics) as follows:

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- concrete surfaces with exposed reinforcements will be treated by cleaning the reinforcements of rust and the concrete covering of the reinforcements will be restored.
- ceramic tiles and the roof elements that are depreciated will be replaced, the roof layers will be restored and the missing, detached or degraded attic sheet metal sidings will be completed. The load-bearing capacity of the roof and its anchoring method to the building will be checked;
- measures will be taken as to remove accidental water losses. Leaks from the basement level will be repaired.
- the building will be surrounded by new sidewalks with appropriate slopes, sealed against the walls with bitumen plugs and the base plaster will be repaired where it is detached.
- if unsafe elements are identified during the works, the builder will notify the designer and the expert in writing.

Where the architectural proposal suggests the construction of door openings, for example in the drying room, the opening will be built with pressed solid brick woven with the masonry adjacent to the opening. If this is not possible, a 15 cm concrete pillar will be provided that will be poured into the joists of the existing wall and the joists of the new wall.

According to the architectural proposal prepared by the company S.C. Allbizz S.R.L., it is proposed to move the current doors in each room to make room for a new bathroom. To create the opening, a 25x25 cm reinforced concrete pillar will be built. To make the changes, the following order of operations will be followed:

1. The positions of the new pillars that border the new position of the door will be marked.
2. The part of the current door that is to be closed is built. The construction is made with pressed solid brick and woven with the existing masonry. If weaving is not possible, a 15 cm space will be left between the new and existing masonry, which will ensure the cooperation between the two masonry parts
3. The masonry will be dismantled along the entire height of the floor, up to the reinforced concrete belt at the top of the wall.
4. 4 Ø 16 holes will be drilled in the reinforced concrete belt.
5. Ø14 reinforcements are inserted into the drilled holes to ensure the pillars continuity. The holes are matted with mortar at the bottom and injected with epoxy resin also at the bottom until the excess is visible at the top of the current belt.
6. The reinforced concrete pillar is poured with excess concrete. Special attention will be paid to the execution of the concreting under the current belt and providing the intimate contact between the new concrete in the pillar and the belt.

The works will be carried out in stages, starting from the ground floor of the building and with the rooms located on one side of the hall.

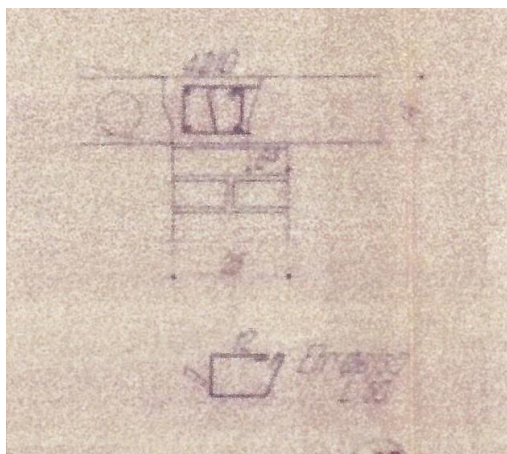
During the works execution, the furniture will be released from the building and special attention will be paid to not storing materials or other things that may cause additional loads on the floors.

First, the works will be carried out on the ground floor, following the floors in order.

When making the gaps for the reinforcements, special attention will be paid to ensure that they do not affect the reinforcement in the current belt (see the photo below) or the end of the prefabricated strip that forms the floor in the hall of the building. It is prohibited to break the prefabricated strips.

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In the areas where the sanitary groups are built, the first prefabricated strip will be broken and a monolyte reinforced concrete floor will be poured.

The moving of the door gaps in the rooms does not lead to additional loads of the building.

The walls percentage will not be influenced by the works scheduled, and by building the pillars one will make a confinement of the longitudinal walls. After executing all the works, the insurance level of the construction will not be changed, still remaining RSIII.

3 Conclusions

3.1. The Dormitory Building, with the height regime of B+Gf+3F located within the Technical Energy College, str. Constitutiei, no. 1, bl. 1, Sibiu municipality, Sibiu County, is made of a single section. The building was designed in 1965 and executed in the immediate following period.

3.2. The Gf+3F building is conceived as a building which lateral rigidity is ensured by an uncoiled masonry structure that collaborates locally with the reinforced concrete frames. The structure is a regular one being provided with a central hall and rooms on each side of the corridor. The rooms have a span of 3.6 m. The dormitory is provided with 15 modules of 3.6 m each in the longitudinal direction.

3.3. The building is in acceptable technical condition, although it has suffered three significant earthquakes, it is well maintained, has an orderly structure with sufficient shear surfaces, and following the evaluation it was classified according to the P100-3/2019 normative, into the RSIII seismic risk class. There is degradation caused by the lack of maintenance works, for example areas where the plaster has fallen. There is also water infiltration in the basement. The perimeter sidewalk of the building is degraded and missing in significant portions.

3.6. Cladding the building with mineral wool boards protected by plaster does not bring additional loads and does not affect the integrity of the structural elements. Before enclosing the building, any defects in the structural elements will be repaired with epoxy mortars (chips, apparent reinforcement, cracks, monolithics). The doors in the dormitory rooms can be moved and sanitary groups can be organized in the rooms, observing the measures specified in the chapter on interventions.

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3.7. The maintenance works of the building will be carried out to remove the causes of the degradations aforementioned, respectively:

- measures will be taken to seal the joint between the sidewalk and the dormitory building
- the structure of the roof will be inspected and the degraded elements will be replaced.
- downpipes that are too short and without spouts will be extended to the ground and measures will be taken to remove water from the building;
- the building will be surrounded by new sidewalks with appropriate slopes, sealed against the walls with bitumen plugs and the plaster of the plinths will be repaired where it is detached.
- the installations that cause losses at the technical basement level will be identified and repaired.
- the compartmentalization changes can be made by providing concrete cores adjacent to the new door openings and by building the openings that are cancelled in strips.

3.8. Other recommendations:

Works must be carried out by teams of qualified workers under the guidance of a technical staff and under the supervision of the site manager, certified by MLPAT.

For all the works carried out, hidden work reports will be drawn up. Works execution will be led by experienced technical staff, who are directly responsible for training the staff who carry out the operations and for complying with the technological sheets regarding the execution of work at height.

The dangerous area in the immediate vicinity of the building that is being thermally refurbished will be marked with warning signs and will be supervised by the staff trained. When starting carrying out the works, a panel will be displayed in a visible place, throughout the works duration, to identify the investment, according to the MLPAT Order no. 63/N of 11.08.1998

10 days before starting the thermal refurbishment works, the Territorial Inspectorate for Constructions will be notified, for taking into account and approving the program stage determined.

All the breaks that are necessary for replacing the joinery or restoring the terrace insulation will be done manually, so as not to give rise to additional vibrations, disturbing the structure. The builder will take measures for the immediate removal of the rubble resulting from the removal of plaster, terrace layers, etc., cleaning the common-use spaces (sidewalk) every day.

During the execution, no changes will be made to the position of the ventilation ducts, drain columns and the slopes of the roof.

The thermal refurbishment of the entrance will be carried out after carrying out the terrace insulation refurbishment works. The contractor will draw up a verified project of the construction site organization, including the entrance scaffolding anchoring system.

The builder who carries out the thermal refurbishment is obliged to take all measures to protect the surrounding areas (transmission of strong vibrations or shocks, material splashes, strong dust release, to ensure the necessary accesses, etc.)

In order to remove any work accidents and the consequences harmful to people's hygiene and health, measures will be taken to know, acquire and comply with the obligations of the following normative acts:

- General labor protection norms developed by the Ministry of Labor and Social Protection and the Ministry of Health;
 - Labor Protection Law no. 3 19/2006;
 - GR no. 300/2006-Minimum health and safety requirements for temporary or mobile construction sites;
 - GR no.1048/2006- Minimum health and safety requirements for the use of personal protective equipment by workers at work;
 - GR no.1051/2006- Minimum health and safety requirements for the manual handling of masses that pose risks to workers;
 - GR no.1091/2006- Minimum health and safety requirements for the workplace;
 - IM 006/1996-Specific labor protection standards for masonry and finishing works (BC10/1996);
 - MLPAT Order no. 9/N/15.03.1993-Regulation on labor protection in construction (Constructions Journal no. 5, 6, 7/1993.
 - P118/1999 Fire protection regulation;
 - MDLPL Order no. 269/04.03.2008 and Interior and Administrative Reform no. 431/31.03.2008 Regulation on the classification of construction products based on fire behavior performance-Fire reaction classes.
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3.9. Under the conditions described in this expert report, the thermal refurbishment works for the Student Dormitory Building belonging to the Energy College are approved, considering that the current safety level of the building to gravitational and horizontal loads does not change and the current classification of the building into the seismic risk class Rs III does not change.

DRAFTED

Eng. GAVRIL POP, MLPAT certified technical expert

Illegible signature, Official stamp

Date,

03.2025

Annexed:

- photo survey;
- building survey drafted by S.C. Allbizz S.R.L. .
- architectural proposal plan drafted by S.C. Allbizz S.R.L.

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Photo 1 – Main entrance. Some infiltrations can be seen at the Annex socket.



Photo 2 – Entrance from Vasile Aaron street, one can see the absence of a perimetral pavement

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Photo 3 – Main entrance; damaged pipehole



Photo 4 - Side entrance towards Semaforului street

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Photo 5 – Photo of the access area to the student dormitory building



Photo 6 – Staircase area; one can see the reinforced concrete frames that support also the flight of stairs

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Photo 7 – Room of the student dormitory building



Photo 8 – Central hall in the student dormitory building

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Photo 9 – Entrance from Electricienilor street. One can see the absence of the pavement and parts with the plaster fallen



Photo 10 – Areas with the plaster fallen and with apparent bricks

