TRANSLATION FROM ROMANIAN

TECHNICAL EXPERT REPORT ON THE MECHANICAL STRENGTH AND STABILITY OF THE SITE WORKSHOPS Gf+2F WITHIN TECHNICAL ENERGY COLLEGE IN VIEW OF THE THERMAL INSULATION

Site address:

Sibiu municipality, str. Energeticîenilor, nr. 1

Work beneficiary:

Sibiu City Hall

Drafted by:
S.C. EUROENVIRONMENTAL CONSULTING SRL

Technical Expert
ENG. POP GAVRIL

March 2025

TECHNICAL EXPERT REPORT

1 Data regarding the technical expert report

1.1 Pages of titles and signatures

Denomination	Technical expert report on the seismic assessment of the Workshops building within the Technical Energy College
Site	Workshops Gf+2F thermal refurbishment
Address	Str. Electricienilor, nr. 1 Sibiu Mun
Expert	Eng. GavrilPop
Expert report number	ER no.1027-03.25
Expert report date	March 2025

Certified technical expert : eng. Gavril Pop
Attestation certificate : 525 from 9.12.1993
Requirements : A1,A2,A3
Technical expert report regarding the seismic evaluation of the building Workshops within Technical Energy College, Sibiu Municipality, Sibiu county
MDRAP certified technical expert : eng. Gavril Pop

1.2 Copy of the certification document of the technical expert

MINISTRY OF DEVELOPMENT, PUBLIC WORKS AND ADMINISTRATION
mr. POP G GAVRIL Manager – Illegible signature Valid from: 22.11.2023
Personal identification number: 1491213400300 Head of office - Illegible signature Until: 22.11.2028
Job: CIVIL ENGINEER Holder's signature - Illegible signature
TECHNICAL EXPERT CERTIFICATE
In the fields: Agro-zoo civil industrial constructions, with structure made of concrete, reinforced concrete, masonry metal and wood.
For the following requirements: strength and stability to static, dynamic strains, including seismic (A1:A2:A3)
Date of issue: 09.12.1993
This badge is valid accompanied by the attestation certificate of the technical expert/project verifier.
Series VA$_E$ no. E 525/09.12.1993

MINISTRY OF DEVELOPMENT, PUBLIC WORKS AND ADMINISTRATION
BADGE series VA$_E$ no. E 525/09.12.1993

1.3 Summary Report

Work name	Technical expert report on the seismic assessment of the Workshops building Gf+2F, 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)			II		
Construction year	1970				
Building function	Highschool				
Total height above ground	17.70	Number of levels	Gf+2F		
Built area (sqm)	1240	Developed area (sqm)	3.720		
Structure system	For the building Gf+2F , the bearing masonry collaborates with reinforced concrete frames. The Workshops Gf Electric Structure in frames made of reinforced concrete				
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**	2	3	
Level of fulfilling seismic composition conditions R_1		61			
Structural damage level R_2		72			
Level of seismic structural insurance , R_3		69			
The seismic risk class in which the construction was classified , Rs		I	II	**III**	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 RsIII, 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		**No**	
Seismic risk class before and after intervention works — thermal refurbishment, Rs		I	II	**III**	IV

Technical Expert Report

2. Evaluation report

2.1 Expert report purpose

The object of the technical expert report consists into building Workshops building 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.

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 1970 by Electromontaj Trust 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 geotechnical study drafted by SC GEOPROCONSULT SRL

2.4.6. 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.
- 10 cm of thermal insulation will be installed over the technical basement
- the additional framework can be restored if there are affected strength elements
- photovoltaic panels will be installed on the building roof

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 ag=0.20g, the corner period of the site Tc=0.7sec., the importance class of the existing construction is II. 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 S0,k = 1,5 KN/sqm, the exposure coefficient ce=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 qref= 0.6 KPa, the terrain category is III- with z0 =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.

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 Workshops Building within the Technical Energy College, located in Electricienilor Street, no. 1, Sibiu Municipality, consists into three sections with the height regime Gf+2F. The building was designed by Energomontaj Trust according to a standard project in 1970 and was built in the immediate following period.

The Workshops Building has a complex shape in plan that approaches the shape of an L with two bodies, which have a ground floor height regime parallel to Vasile Aaron Street and the main body with the height regime Gf+2F perpendicular to the aforementioned street.

The Ground Floor is divided into two main functions, garage and electrical workshop. The Garage is divided into an opening of approx. 7.5 m and 4 bays (2.25+2x2.5+3.85 m). The garage is built in the first 3 bays while the last bay is organized with washbasins. The Electrical Workshop building is divided into two openings of approximately 5 m and 5 bays (2.2 m + 4x3.4 m). In the first bay, flammable materials are stored, while the workshop is made up of 4 bays of 3.4 m. The garage and the Electrical workshop communicate through a hall, which also provides access to the Gf+2F building.

The Gf+2Fbuilding has an irregular shape in plan that can be seen as a rectangle with dimensions of 32.70 x 16.8 m. The building is narrower towards Vasile Aaron Street by approximately 11 m, where the sanitary facilities are organized in a 3.40 m bay. Continuing the sanitary facilities, a generous hall area with an approximate size of 11 x 6.90 m was created. In this area, the staircase and the distribution hall are provided with a dense ribbed floor. From the lobby area, access is made to the workshops on each level. The workshops are each organized in a 7.20 m opening and are separated by a median wall. The workshop located towards the courtyard is provided with 6 spans of 3.40 m. The workshop on the north side is made in 4 spans of 3.40 m and one span of 1.40 m. The workshop continues with a 6.80 m span in which the Low Voltage Room, the transformer station, the distribution room and various warehouses were organized on the ground floor. On the 1st floor, the laboratory facing the courtyard was divided into two laboratories by introducing two dividing walls according to the relief.

The building is provided with a technical channel where the installations are provided. In front of the classrooms, technical channels are provided through which the pipes serving each classroom are passed.

The Gf+2F building has the first level at an elevation of +4.50 m and the 2nd level at an elevation of +9.00 m. The natural ground elevation is approximately 50 cm below the +0.00 elevation, which represents the finished grade of the ground floor. The ground floor building has a free height of 3.35 m. A wooden frame and a ceramic tile covering were built over both building bodies.

The strength structure of the ground floor buildings is similar, above the +0.00 elevation consists into:

- Vertical elements: reinforced concrete columns generally with a section of 30x30 cm. There are also columns with sections of 25x30 cm or 30x40 cm.
- Reinforced concrete walls with a thickness of 20 cm. These are provided perimetrically on the 2.20 m span provided at the end of the building.
- Horizontal elements: Floor made of reinforced concrete beams generally 30X50 cm

The load-bearing structure on the Gf+2F area, above the +0.00 elevation, consists into:

• Vertical elements: reinforced concrete columns with a section of 30x40 cm, 25x 25 cm, 25x30 cm, 30x30 cm

• Horizontal elements: transverse beams in the main frames 25 x 70 cm. Longitudinal beams 40x30 cm, belts provided over the masonry walls.

• On the hall area, the floor is made in a solution of dense ribs with a rib height of 12x45 cm at a step of 70 cm.

The infrastructure of the building is made as follows:

• Isolated foundations with dimensions of 1.5x1.9 m under the main columns, connected with balancing beams

• Isolated foundations of different sizes connected to each other with foundation beams.

• The foundations are common for the 3 building bodies.

2.6. QUALITATIVE EVALUATION OF THE WORKSHOPS BUILDING

The workshops building was designed in 1970 and was built in the immediate following period. Its structural system was designed and dimensioned based on the P13/1963 seismic code, the first Romanian seismic code that has been consistently improved over the years. The Gf+2F building is designed as a building which lateral rigidity is ensured by a system of load-bearing masonry walls that collaborate with a reinforced concrete frame system. The masonry diaphragms are of sufficient thickness, are provided with bulbs at the ends and have shear sections appropriate for the height regime of the building and for the seismic intensity of the site. The frame columns have appropriate concrete sections that ensure an intensity of axial stress allowed by the standards for ductile behavior. The floors are generally 10 cm thick and do not present gaps that would affect the washer effect. The beneficiary owns the project based on which the building was built.

The Ground Floor consists into two functional areas that are connected at the level of the strength structure by means of a void.

The garage has a load-bearing masonry strength structure that collaborates with a reinforced concrete frame system. The masonry walls are provided in a perimeter. These are bordered with 25x25 or 25x40 cm columns. In the transverse direction, 3 reinforced concrete frames were provided at a step between 2.25-3.85m. It is worth noting that compared to the initial project where the garage was intended for changing rooms and showers, a garage was built inside it. In order to access the garage, a reinforced concrete pillar was removed in axis 15.

The workshop building is generally made of frames consisting of 3 reinforced concrete pillars with a section of 30x30 cm and a beam at the top with a section of 30x50 cm. Locally, on the side facing the high school building, a SAS and 2 hazardous materials warehouses were built, which are bordered by 20 cm thick reinforced concrete walls around the perimeter.

The Gf+2F building is a construction of load-bearing masonry walls that collaborate with a frame system. In the transverse direction, there are masonry walls that border the sanitary group. The 2 workshops are also bordered at the ends by masonry walls. On the north side, where storage areas are provided, these

are closed with 30 cm thick masonry walls. In the longitudinal direction, the building is provided with a 25 cm thick masonry wall that separates the two workshops. There are also masonry walls in the warehouse area. The masonry walls are confined at the ends with reinforced concrete pillars.
Compared to the initial project, a framework with a wooden structure and ceramic tile covering was created. The framework has a height of 4.20 m at the ridge.
A foundation excavation was carried out at one of the pillars of the P+2E body. The foundation depth specified in the project is -2.5 m compared to the CTN. In the excavation carried out, the foundation elevation was identified at -2.70 m. The continuous foundation of 45 cm and the sole that has 1.8x1.4 m according to the geotechnical study were identified. According to the project, the dimensions are 2.5 x 1.55 m. It is noted that the 2.5 m dimension cannot be correctly evaluated in the open air, only half of the foundation being outside the building footprint.
The technical condition of the building is appropriate with some exceptions as follows:
-- the exterior plasters show depreciated, crumbling and partially exfoliated areas;
-- there are traces of infiltration, especially in the garage body.
-- the polystyrene cladding is degraded, especially on the ground floor, it shows traces of being torn off and burned;
-- the joinery shows some leaks;
-- The additional framework is not sealed in places (e.g. over the garage body) and shows degraded and rotten elements.
- the sidewalk is detached from the wall and has a reverse slope in certain sections. In some areas, the guard sidewalk does not exist;
-- there are some traces of infiltration at the base level, due to the lack of a sealing detail of the sidewalk, of the drainpipes that are leaking.
-- the joint between the sections is not properly resolved and has cracks
The constructive system of the building analyzed in light of the current norms, namely "Seismic Design Code - Part I - Design Provisions for Buildings. Foundations for Designing Structures in Constructions", indicative P100-1/2013, and "Seismic Design Code - Part III - Provisions for the Seismic Assessment of Current Buildings, indicative P100-3/2019, and the following is found:
■ structural simplicity - a clear, direct and uninterrupted path of the seismic forces to the foundation ground is ensured;
■ structural redundancy - the failure of a single structural element does not lead to the loss of stability of the structure;
■ structural regularity in plan - the rectangular construction has a compact shape and is approximately symmetrical in plan in relation to two orthogonal directions, in terms of distribution, resistance capacities and masses. The construction does not partially complies with the regularity criteria;
■ vertical regularity — the structural system is vertically monotonous without discontinuities that would deviate the load path, without reductions in rigidity and with masses uniformly distributed vertically.
• rigidity and torsional resistance are partially met, there are at the level of each masonry diaphragm body on the perimeter of the building;
• monolithic floors have sufficient rigidity and are correctly connected to the vertical structural elements to play the role of horizontal diaphragm;
As part of the geotechnical study, a foundation excavation was carried out

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 workshops 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:

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

y = 1- constructions of class III importance;

a_g=0.20 g for IMR = 225 years ;

$T = k_T \times H^{3/4} = 0.045 \times 7^{3}/^{4} = 0.29$ sec ;

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

β_0=2,5 ;

γ = 0.85 building with more than one floor and one opening ;

q = 2,5 – confined masonry structures acc.to P100-3, annex D, pt. D.3.3.1.6 and annex B pt. 4.2.1.

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

According to Annex D.3. of the P100-3/2019 code, the level 1 methodology can be applied to buildings made of masonry confined regularly in plan and elevation with monolithic reinforced concrete floors with a maximum height of Gf+2F, located in areas with ag=0.20 g.

Structure Groundfloor Garage

Current constructions of class III importance with a future operating life of more than 40 years. A calculation is made using the level 1 methodology

for the site: *Workshops Gf+2F within Technical Energy College, Electricienilor Street, no. 1, Sibiu Mun, Sibiu County*

- built area S = 92 sqm;
- building weight W = 128.8 to. ;
- columns area CA = 0.79 sqm;
- seismic coefficient c = 1.2 x 0,2 x 2, 5 / 2.5 x 0.88= 0.176;
- basic cutting force Fb = c x G = 0.18x128.8 = 22.67 to.
- concrete B200 - ftd = 60 t/sqm design strength to tension of concrete poured into walls;
  - vadm = 1,4 ftd /CF = 1,4 x 60/1.2 = 70 t/sqm in walls;
  - vadm = 0,7 ftd /CF = 0,7 x 60/1.2 = 35 t/sqm – in columns;

Checking of the vertical items:

$F_{head,columns}$ 0.79 sqm X 35t/sqm = 27 to ;

Given only the contribution of the reinforced concrete columns:

the ratio between seismic capacity and structural requirement

R'3 = Fhead/Fb 22.7/19>1

Structure Groundfloor Electric Workshop

Current constructions of class III importance with a future operating life of more than 40 years. According to code P100-3/2019, buildings having a structure with reinforced concrete columns with up to 3 overgrounds levels with or without masonry filling walls, located in seismic areas with land acceleration values for design a_g = 0.20 g, can be evaluated by using the level 1 methodology.

- built area S = 190 sqm;
- building weight W = 266 to. ;
- columns area CA = 1.23 sqm;
- transversal walls area Ap=2.58 sqm
- longitudinal walls area Ap =2.28 sqm
- seismic coefficient c = 1.2 x 0,2 x 2, 5 / 2.5 = 0.2;
- basic cutting force Fb = c x G = 0.2x266 = 53.2 to.
- concrete B200 - ftd = 60 t/sqm design strength to tension of concrete poured into walls;
- vadm = 1,4 ftd /CF = 1,4 x 60/1.2 = 70 t/sqm in walls;
- vadm = 0,7 ftd /CF = 0,7 x 60/1.2 = 35 t/sqm – in columns;

Checking of the vertical items:

Fhead,columns 1.23 sqmX 35t/sqm = 43 to ;

$F_{head,longitudinal\ walls}$ = 2.28 sqm x 70/t/sqm = 159 to

$F_{\sout{head}}=F_{head,\ columns}+ F_{head,columns}$=159+43=202 to

the ratio between seismic capacity and structural requirement

R'3 = Fhead/Fb 202/45>1

The quantitative assessment shows a minimum structural safety level R3>1. However, it is considered that due to the reinforcement details that do not ensure a ductility similar to that of the codes in force, the safety level can be estimated at R3=70%. This is located between 65% and 90%, which places the construction in the seismic risk class RsIII with the recommendation that no consolidation measures are necessary.

Workshops Gf+2F

Next, the calculation is made for the Gf+2F building. For this building, the load-bearing masonry structure confined with reinforced concrete cores is taken into account.

for the site: *Workshops Gf+2F within Technical Energy College, Electricienilor Street, no. 1, Sibiu Mun, Sibiu County*

- built area S = 465 sqm;
- building weight: W = 1953 to. ;
- columns area CA = 3.10 sqm;
- basic cutting force: Fb = c x G = 0.187x1953 = 365.2 to.
- concrete B200 - ftd = 60 t/sqm design strength to tension of concrete poured into walls;
- vadm = 0,7 ftd /CF = 0,7 x 60/1.2 = 35 t/sqm – in columns

Checking of the vertical items:

Fhead,columns 3.10 sqmX 35t/sqm = 108 to ;

One calculated the area of bearing masonry walls on the two main directions of the building:

- transversal walls area Apt=12.5 sqm
-longitudinal walls area Apl =16.8 sqm

Then one calculates the average compression unit stress ʊ0, also considering the contribution of its frames, that is:

ʊ0=G/(Apl+Apt)= 27 to/sqm

Admissible value of the average tangential unit stress

Vadm=1,33 Tk/(CF γm)√ /(1+ ʊ0 CF γm+/(2 Tk)) = 11.71 tonf/sqm

where :

Tk =0,12 N/mm2 for masonry with cement mortar.

γm = 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. '

Fhead,walls= Apl x vadm= 12.5 sqm x 11.71 = 146.4 to.

Fhead,=Fhead,walls + Fhead,columns=146.4+108=254.4

the ratio between seismic capacity and structural requirement

R'3 = Fhead/Fb 254.4/365.2=0.69

The evaluation using the level 1 methodology shows a minimum structural assurance level of R3= 69%. This is located between 65% and 90%, which places the construction in the seismic risk class RsIII with the recommendation that no consolidation measures are necessary.

2.9 The level of fulfilling the terms for seismic structure, R1

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

Technical Expert Report

for the site: *Workshops Gf+2F within Technical Energy College, Electricienilor Street, no. 1, Sibiu Mun, Sibiu County*

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:

- 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 5 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 8 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 100-1/2013
- minor non-compliance 7 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.

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 7 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 7 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.

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
R1 =76*0.8=61 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.

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 Ah=25 points, respectively Av=65 for the horizontal elements. In conclusion, for the degree of structural damage R2=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 that makes the scope of the expert report was evaluated in accordance with the level 1 methodology.

Following the qualitative assessment of the level of fulfilling the seismic composition conditions R1, it obtained a total of 61 points, falling into the seismic risk class RsIII.

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

The evaluation using the level 1 methodology shows a minimum structural insurance level R3= 69%. This is between 65% and 90%, which places the construction into the seismic risk class RsIII.

Taking into account the values of the three indicators R1, R2 and R3, it is assessed based on the code P100-3/2019, for the Ateliere building, located within the C.T. Energetic, str. Electricienilor, no. 1, Plun. Sibiu, Sibiu county 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 interventions

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

The thermal refurbishment works are described below:

-- replacement of the joinery, including the glazed part and sealing of the penetrations

- removing the current thermal insulation;

- replacing the brise-soleil from the side facade;

-- cladding of the perimeter walls on the outside with 15 cm thick mineral wool boards, 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 thermal insulation;

-- over the floor made of hollow strips at the last level, the current thermal and waterproofing assembly will be removed and a 25 cm thick wool thermal insulation will be installed;

Cladding the building with mineral wool and 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, visible reinforcement, cracks, monolithics) as follows:

-- the concrete surfaces with visible reinforcement will be treated by cleaning the reinforcement from rust and the concrete covering layer of the reinforcement will be restored.

-- the metal sheet and the elements of the roof structure that are depreciated will be replaced, the roof layers will be restored and the missing, detached or degraded attic sheet metal sections will be completed. The load-bearing capacity of the roof structure and its anchoring method to the building will be checked;

-- measures will be taken to remove accidental water losses

-- 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

- if unsafe items are identified during the works, the builder will notify the designer and the expert in writing

Technical Expert Report

for the site: *Workshops Gf+2F within Technical Energy College, Electricienilor Street, no. 1, Sibiu Mun, Sibiu County*

Regarding the Gf+2F building, the brise-soleils mounted in the facade axes can be removed. Their dismantling will be done by cutting pieces that can be manipulated by hand, without affecting the existing structure that remains. The vertical brise-soleils are made of mortar on Pl100 rabbet mesh and are 10 cm thick with a length in plan of 80 cm. There are vertical brise-soleils that are connected to the reinforced concrete pillars of the structure. The horizontal ones are made of B200 concrete reinforced longitudinally with 6 mm bars. On each floor there are 3 horizontal brise-soleils, 1 above the masonry parapet and 2 located between the parapet and the slab of the next floor.

The dismantling will start from the upper horizontal brise-soleil. It will be supported, after which the brise-soleil will be cut with a diamond disc on the front side of the 30x40 cm strength pillars and possibly in smaller segments that can be easily removed. One will continue after previously supporting the second slat located immediately below. Once the two horizontal slats have been removed, the horizontal slat that is made over the masonry parapet can be cut on the front side of the masonry wall. The belt located over the masonry with dimensions 30x30 cm or the reinforced concrete pillars 30x40 cm will not be affected. The vertical slats will be supported and then cut into easy-to-handle pieces. The vertical slats connected to the pillars can also be removed. These can be cut on the front side of the pillar.

When cutting, special importance will be given to ensuring that the remaining reinforced concrete elements are not affected by the cutting. The dismantling of the slats by breaking, which could introduce vibrations into the remaining structural elements, is prohibited. The resulting rubble will not be stored on the nets and will be removed as it is produced. The apparent reinforcement will be covered with passivation agent and epoxy mortar immediately after cutting.

Regarding the garage, there is no technical documentation to certify the change of destination from locker rooms to garage where a door was made in axis I and a pillar was removed. In order to ensure the support of the beam in axis 15 perpendicular to the exterior wall, a frame will be made. The replacement frame will make up for the lack of the pillar provided in the initial project and which will border the garage door, inside the garage. 2 30x30 cm pillars and a 30x50 cm reinforced concrete beam are provided. The pillars will border the garage door. In axis 14, the new pillar will be connected with chemical anchors to the existing pillar. At the other end of the door opening, the masonry will be dismantled and the pillar will be poured in strips with the existing masonry wall. Under the existing beam in axis 15, a HEA200 steel beam with a length of approximately 1 m will be provided before the concrete beam is cast. The HEA 200 beam will be secured to the concrete current beam through some chemically monolithic bolts.

Subsequently, the reinforced concrete beam is poured in excess so as to ensure the intimate contact between the new reinforced concrete beam and the HEA200 profile. The reinforced concrete columns of the new frame will be provided on a foundation footing that will go between the isolated foundations of the existing columns.

The architectural proposal provides the creation of gaps in the reinforced concrete walls of the Gf Electrical Workshop. It is planned to widen the gap between the technical workshop and the hall from 80 cm to 100 cm. To widen the gap, approximately 40 cm of the concrete wall will be broken along the wall. (20 cm gap provided + 20 cm). At the top of the gap, a 15 cm break is also planned above the current level of the door gap. When breaking, special attention will be paid to ensuring that the current reinforcements in the wall are not affected. The vertical reinforcements in the 20 cm of the door can be cut on the front side of the slab. In the additional 20 cm, a reinforcement frame will be made consisting of longitudinal reinforcement with 4 Ø14 bars provided with stirrups. The current horizontal reinforcements will be turned and anchored in the newly created bulb. At the top, in the 15 cm of excess, a stirrupped lintel reinforcement will be provided that will be anchored in the newly created column. Current wall reinforcements will be kept and anchored in the newly created bulb. The bulb and lintel reinforcements will be chemically monolithic in the existing concrete wall and at the bottom in the foundation. The new column and lintel will be re-concreted by pouring concrete in excess. To create the door gap between the hall and the warehouse, the wall is broken over a length of 100 cm (80 cm door + 20 cm on each side of the door). At the top, a break is made 15 cm above the upper part of the door. On the sides of the opening, 2 column frames similar to the one described for the previous opening will be created. At the top of the opening, a lintel reinforcement is provided that is anchored in the newly provided columns. The column reinforcements will be chemically monolithicized at the top in the existing concrete wall and at the bottom in the foundations.

The window openings will be closed with masonry. Special attention will be paid to the integration of the new masonry with the existing masonry and where this is not possible, concrete elements will be poured into the joints of the new masonry and the existing masonry.

The architectural proposal provided for the replacement of light partitions and the creation of new partitions. The partitions that are being dismantled, ex between testings laboratory and the hall, do not have a strength role. These can be dismantled and will be mandatory replaced with light plasterboard type partitions that do not bring significant additional loads to the construction.

In axis I adjacent to the stairs, the architectural proposal provides the construction of a new wall. This can be made with a lightweight structure without additional measures. If a masonry wall is provided, it is provided along the entire vertical and at the end from axis 9 a reinforced concrete column measuring approximately 20x30 cm will be built, cast in strips with the masonry. The column reinforcements will be chemically monolithic at both ends in the concrete beams with which they intersect. Chemical monolithication will be done for 2 bars provided at the end of the column so that the column does not develop a bending moment at the ends.

3 Conclusions

3.1 The Workshops building, with the height regime Gf+2F located within the Technical Energy College, str. Energeticienîlor, no. 1, Sibiu Mun, Sibiu county, consists into three independent sections separated by seismic joint. The building was designed in 1970 and built in the immediate period. The building consists into two blocks with height regime Gf, respectively the Garage and the Electric Workshop and one block with height regime Gf+2F. These have independent strength structures.

3.2. Building Gf+2F is designed as a building which lateral rigidity is assured by a masonry system that collaborates with a reinforced concrete frames system. The Gf electric workshop is built as a structure in frames with some of the walls built of reinforced concrete that separate warehouses with dangerous workshop products.

3.3. Building Gf+2F is in good 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 as a structurally sound building according to P100-3/2019 normative, into the RsIII seismic risk class.

3.4. Cladding the building with polystyrene boards protected with 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) and the system of brice-soleils will be removed with observing the recommendations of this expert report to avoid the degradation of the remaining structural items.

3.5. Building maintenance works will be carried out as to remove the causes of the degradations described, namely:

- measures will be taken to seal the joint between the sidewalk and the house

-- 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 wuth new sidewalks with appropriate slopes, sealed against the walls with bitumen plugs and the base plaster will be repaired where it is detached.

- the current brice-soleils of the block Gf+2F will be removed
- a new reinforced concrete frame to replace the column cut into garage will be implemented
- the partition walls proposed for dismantling can be dismantled. The new walls can be built of plasterboard solution
- the window gaps provided with masonry will be closed, by paying special attention to weaving the new masonry with the current one
- gaps can be made in the reinforced concrete walls between the hall and the electric workshop with observing the measures detailed in the previous chapter
- one can change the closing adjacent to the stair from axis I masonry with building a reinforced concrete bulb

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 carrying out will be led by experienced technical staff, who are directly responsible for training the staff performing 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 undergoing thermal refurbishment will be marked with warning signs and will be supervised by trained staff. At the start of the execution, a panel will be displayed in a visible place, throughout the works duration, to identify the investment, according to MLPAT Order no. 63/N of 11.08.1998

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

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.

The execution of the terrace insulation works will be done in sections, depending on the builder's equipment, on areas that can be protected in the event of inclement weather, which could affect the finishes of the classrooms located on the last floor.

During the execution, no changes will be made to the position of the ventilation grids, the drainage columns and the terrace slopes.
The thermal restoration of the entrance will be carried out after the execution of the terrace insulation restoration works. The contractor will draw up a verified site organization project, including the entrance scaffolding anchoring system.
The builder who carries out the thermal refurbishment has to take all measures to protect the surroundings (transmission of strong vibrations or shocks, splashing of material, strong dust release, to ensure the necessary accesses, etc.)
In order to prevent any work accidents and the consequences harmful to hygiene and human health, measures will be taken to know, acquire and observe the obligations of the following normative acts:
-- General labor protection rules drafted by the Ministry of Labor and Social Protection and by the Ministry of Health;
-- Labor Protection Law no. 319/2006;
- GR no. 300/2006-Minimum safety and health requirements for temporary or mobile construction sites;
- GR no. 1048/2006- Minimum safety and health requirements for the use of personal protection equipment by workers at work;
- GR no. 1051/2006- Minimum safety and health requirements for the manual handling of masses that pose risks to workers;
- GR no. 1091/2006 Minimum safety and health 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 Ministry of Home Affairs and Administrative Reform no. 431/31.03.2008 Regulation on the classification of construction products based on fire behavior performance - Fire reaction classes.

3.9. Under the conditions described in this expert report, the thermal refurbishment works for the Workshops Building belonging to Sibiu Technical Energy College are approved, considering that the current safety level of the building to gravitational and horizontal loads is not changed and the current classification of the building into the seismic risk class Rs III is not changed.

DRAFTED BY Date
Eng. GAVR1L POP, technical expert certified by MLPAT 04.2025
Illegible signature, Official stamp

Attached:
-- photo survey;
- building survey drafted by S.C. Allbizz S.R.L.
- architecture proposal made by S.C. Allbizz S.R.L.

Photo 1 – Main entrance – one can see the brice-soleils from the laboratory level

Photo 2 – Left side entrance from Vasile Aaron street. In the foreground one can see the block Gf Electric Workshop, to the left the Garage and in the secondary plan, the block Gf+2F

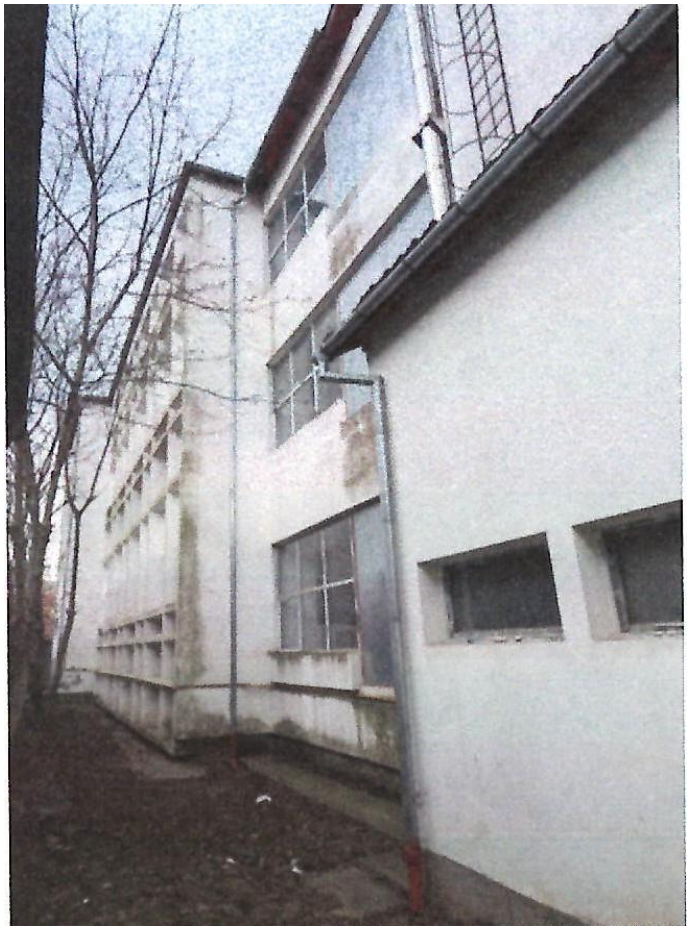

Photo 3 – Photo from the thermal system. One can see some plaster degradations.

Photo 4 – Photo from the main hall, one can see the ribbed floor and staircase

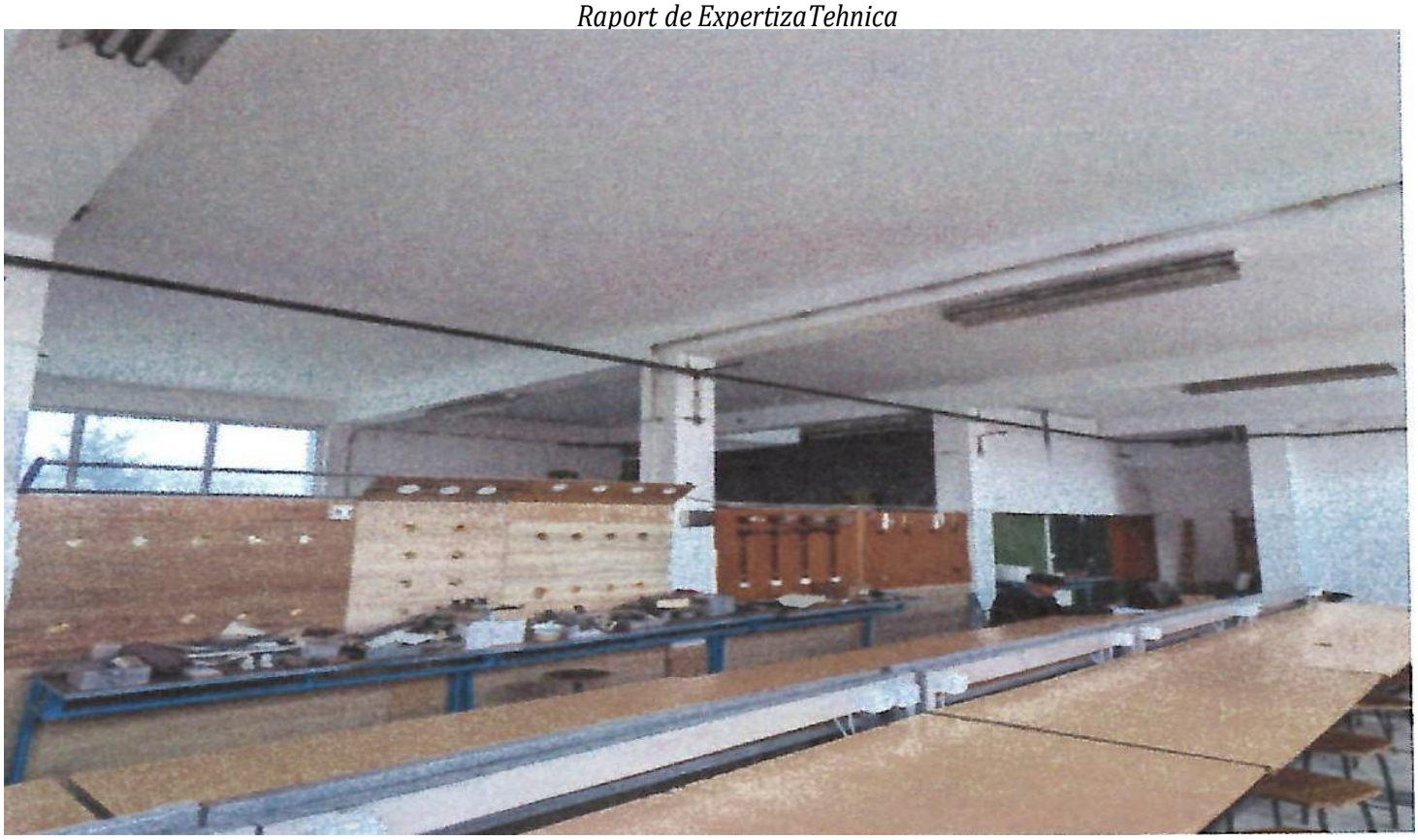

Photo 5 – Photo from Gf Electric Workshop. One can see the structure made of concrete frames of the building block

Photo 6 – Photo of the Electric Workshop block. One can see the structure in frames and in the left side the reinforced concrete walls

Photo 7 – Photo of the Gf+2F block, at Gf the Electrical mechanics workshop. One can see the median wall of masonry and the reinforced concrete frames

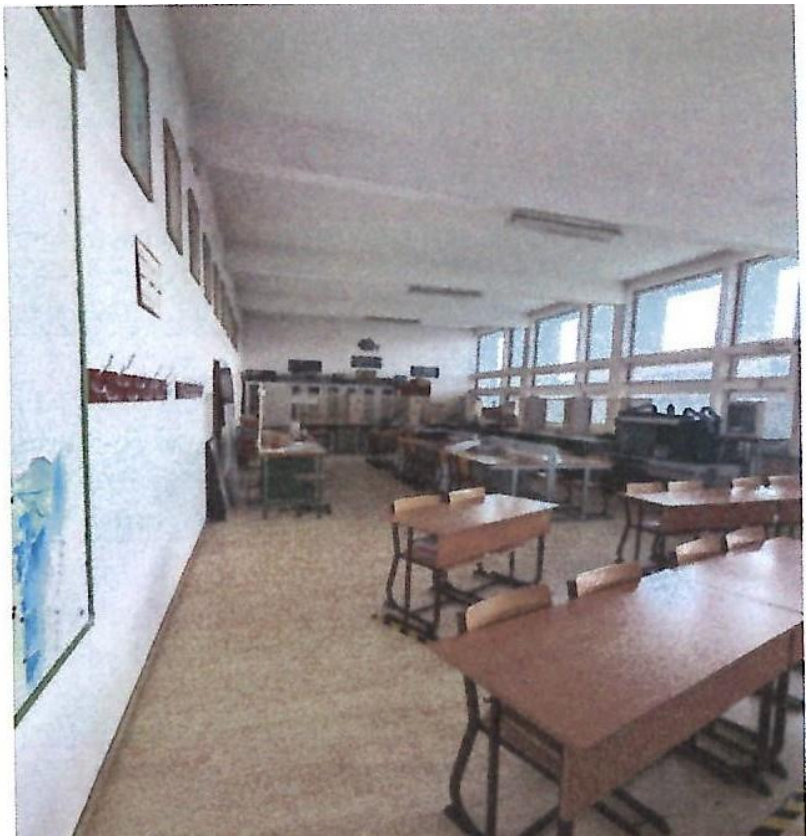

Photo 8 – Photo of the 2nd floor of Telecommunications laboratory

Photo 9 – Entrance to the Electric Workshop

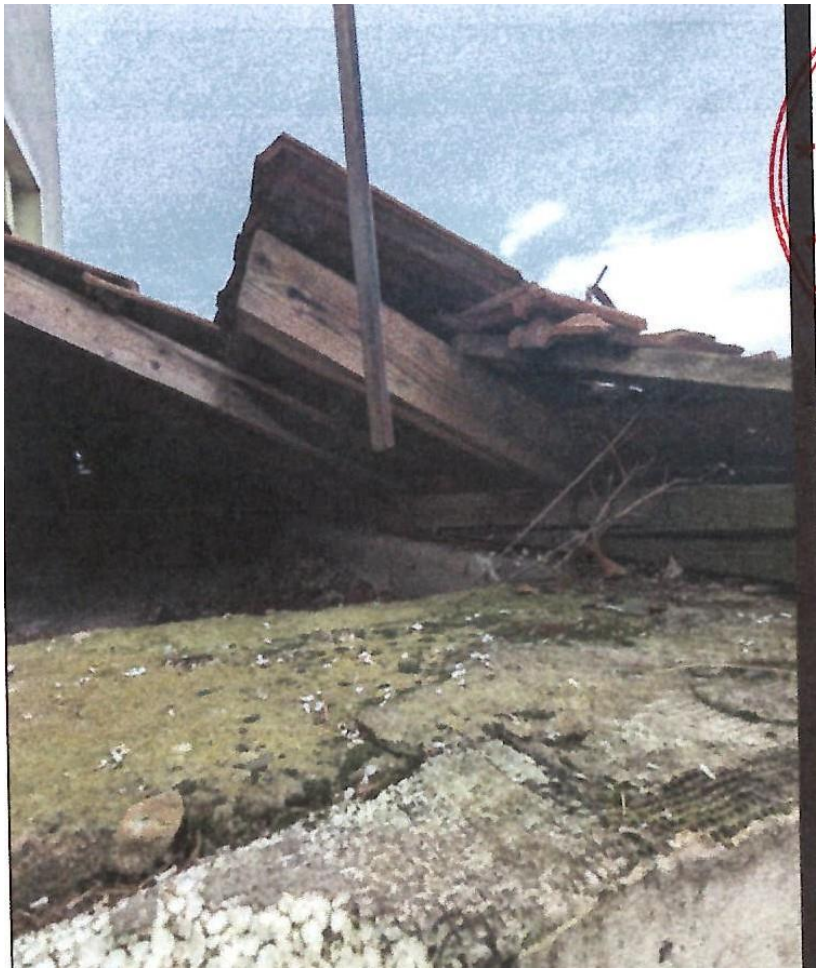

Photo 10 – Photo of the degrading framing on the Gf+2F block

Photo 11 – Photo of the posterior entrance on the transformer station. One can see that the termal insulation has been vandalized.

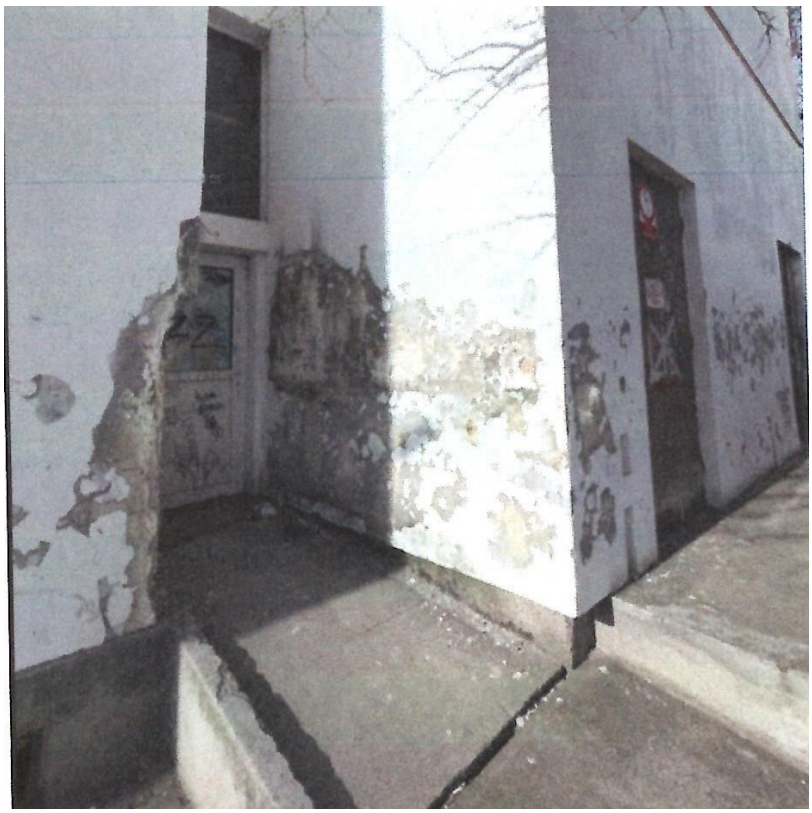

Photo 12 – Right side photo. One can see the secondary entries and the thermal insulation degradations.

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