TRANSLATION FROM ROMANIAN

TECHNICAL EXPERT REPORT ON THE MECHANICAL STRENGTH AND STABILITY OF THE SITE Gf-GYM 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 Official stamp
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1 Data regarding the technical expert report

1.1 Pages of titles and signatures

1.2 Denomination	Technical expert report regarding the seismic evaluation of the building Gf- Gym Hall, within Technical Energy College, Sibiu
Site	Gf - Gym Hall, thermal refurbishment
Address	Str. Energ eticienilor, no. 1 Sibiu municipality
Exp ert	E n g . Gavril Pop
Expert report no,	E.R. no.1029- 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 Gf- Gym Hall, 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
Personal identification number: 1491213400300
Job: CIVIL ENGINEER
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

Manager – Illegible signature
Head of office - Illegible signature
Valid from: 22.11.2023
Until: 22.11.2028
Holder's signature - Illegible signature
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 Gf- Gym Hall building, 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	1971				
Building function	Gym Hall				
Total height above ground	8,76	Number of levels	Gf		
Built area (sqm)	624	Developed area (sqm)	624		
Structure system	Frames, masonry diaphragms and reinforced concrete floors				
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		62			
Structural damage level R_2		70			
Level of seismic structural insurance , R_3		73			
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 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

2 Evaluation report

2.1 Expert report purpose

The object of the technical expert report consists into building C4, Gym Hall of 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 1967 by I.P.C.T. and adapted in the field by Trustul Electromontaj 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 additional framework can be restored if there are affected strength elements without increasing the loads on the roof.
- no photovoltaic panels will be installed on the roof of the gym hall.

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 $S_{0,k}$ = 1,5 KN/sqm, the exposure coefficient ce=0.8 (total exposure),

2.4.3. 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 z_0 =0.3.

2.4.4. 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 Gym Hall building within the Technical Energy College, located in Electricienilor Street, no. 1, Sibiu Municipality, is made of a single section with the height regime Gf. The building was designed based on a standard project drawn up in 1967 by I.P.C.T., adapted to the site in 1971 by Electromontaj Trust and was built in the immediate following period.

- The gym hall consists into a single section, being functionally divided into two areas, namely the actual area of the gym hall and an annexed area functioning as locker rooms, sports equipment storage and heating plant. The gym hall is located between the axes B-E and is made with an opening of 15.30 m and 8 spans of 3.60 m. The height regime of this area is a high ground floor with a ridge height of +8.83 m and an useful height under the reinforced concrete prefabricated beams of 6.50 m.
- The annex area is made with an opening of 4.10 m and 8 spans of 3.60 m to which is added at the ends a span of 2.625 m over which a terrace was initially made. Currently, on the left side, a closure of this terrace has been made, transforming the space into a thermal power plant. The annex area has a ridge height of 3.85 m, and a maximum useful height of approximately 2.90 m.
- The strength structure of the gym hall area, above the elevation ±0.00 consists into:
- • Vertical elements: reinforced concrete columns with a section of 35x70 cm on the longitudinal entrances provided with a high masonry parapet with glazed surfaces and 30x30 cm columns in the masonry gables;
- • Horizontal elements: Floor made of prefabricated reinforced concrete beams with a width of 30 cm, a variable height between 80-120 cm and an opening of 15.30m that provide the roof slope. Narrow strips with round openings 360x60x14 cm were provided over the beams.
- The strength structure on the annex area, above the ±0,0 elevation, consists into:
- • Vertical elements: reinforced concrete columns with a section of 30x40 cm, 30x 30 cm and perimeter masonry walls;
- • Horizontal elements longitudinal beams of various sizes and prefabricated floor made of narrow strips with round openings 400x60x14 cm. The floor is partially made in a monolithic version.
- The construction infrastructure is made as follows:
- • Isolated foundations with dimensions 1.5x1.8 m under the main pillars, connected with a balancing beam.
- • Isolated foundations 1.3x1.3 m under the pillars 30x30 foundation pads provided under the walls in the A axis provided with bearings in front of the pillars.

2.6. QUALITATIVE EVALUATION OF THE SITE GYM HALL

Gf of the gym hall was built in 1971, its structural system was designed and dimensioned based on the seismic code P13/1963, the first Romanian seismic code that has been consistently improved over the years..

Technical Expert Report

for the site: *Gym Hall within Technical Energy College, Electricienilor Street, no. 1, Sibiu Mun, Sibiu county*

Gf is designed as a building which lateral rigidity is ensured by an orthogonal system of reinforced concrete frames collaborating with an orthogonal system of masonry diaphragms. In the transverse direction the roof washer rests on the rigid masonry walls framed at the ends of the building and consistently unloads the flexible transverse frames. In the longitudinal direction the mass loads of the roof are transmitted to the masonry parapets by means of short columns at the height of the glazed surfaces. The masonry diaphragms have a 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 columns of the frames have appropriate concrete sections that ensure an axial stress intensity allowed by the standards for ductile behavior. The short columns are not properly reinforced. The floors are thicker than 10 cm and do not have gaps that would affect the washer effect. The beneficiary owns the project based on which the building was built.

The gym hall area is made up of reinforced concrete frames in the transverse direction. The columns have a section of 35x70 cm and are reinforced with 6Ө20 longitudinally and with Ө6/30 cm transverse stirrups.

A reinforced concrete beam with a variable height between 80 cm -120 cm was provided at the top. The roof slopes are produced by the difference in height of the beam. The beam reinforcement is composed of 6Ө25 +2Ө20 at the bottom. At the top, the reinforcement is composed of 3Ө25+2Ө20. The transverse reinforcement is provided by Ө8/35 cm OB38 stirrups which are compacted in the support area. The shear force is also taken up by means of longitudinal reinforcements that rise to the upper part.

In the marginal axes of the structure, masonry diaphragms with a thickness of 30 cm including plaster are provided. These are provided with 30x50 cm pillars at the ends and with 30x30 cm intermediate pillars. A 30x50 beam was arranged at the roof level at the upper part. Intermediately at the elevation +4.45 m, a 30x40 cm beam was provided.

Longitudinally, a 33x51 cm reinforced concrete beam was provided at the roof level.

At the annex level, a belt was provided that supports the annex floor 35x28 cm.

The strength structure of the annex is composed of the gym pillars and the 30x40 cm pillars provided at the edge of the building. The floor is made of prefabricated strips with a length of 4 m and a width of 60 cm.

Compared to the initial project, a light frame was created with a wooden structure without a trafficable bridge and with a corrugated sheet metal covering. Also on the left side entrance, the space that was initially planned as a terrace was closed, resulting in the current room of the heating plant. The closure is made of masonry.

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

- the exterior plasters show depreciated, crumbling and partially exfoliated areas;
- the carpentry shows some leaks;

-- the sidewalk is detached from the wall and has a reverse slope on certain portions;

-- 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 show leaks. It will also be checked that there are no leaks from the rainwater or sewage networks in the area.

A foundation excavation was carried out which shows the foundation depth as being -2.20 m from the CTN. A balancing concrete beam with a height of 45 cm was identified , as well as a bearing with the sizes of 1.5x.1.30 m.

The geotechnical study states that the current condition of the foundations is proper.

The constructive system of the building analyzed in light of the current rules, namely "Seismic Design Code - Part I - Design Provisions for Buildings. Basics of Design of Structures in Constructions", indicative P100-1/2013, and "Seismic Design Code - Part III - Provisions for the Seismic Assessment of Existing Buildings, indicative P100-3/2019, shows the following:

• 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 construction in the form of a rectangle has a compact shape but is not approximately symmetrical in plan in relation to two orthogonal directions, in terms of distribution, resistance capacities and masses;

- vertical regularity - the structural system is monotonous vertically without discontinuities that divert the load path, without reductions in stiffness and with masses uniformly distributed vertically.

• stiffness and torsional strength are fulfilled in part, the distribution of masses is not uniform due to the presence of the annex;

• precast strip floors have sufficient stiffness and are correctly connected to the vertical structural elements to play the role of horizontal diaphragm;

2.7. <u>Knowledge level</u>

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. <u>Evaluation methodology</u>

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.

Building Gf- Gym Hall, 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 x $H^{3/4}$=0.045 x $7^{3/4}$= 0.24 sec ;

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

β_0= 2,5 ;

γ = 1 groundfloor boxes;

q = 2,50 - reinforced concrete frame structures level 1 methodology, acc.to P100-3, annex B, pt. B.4.1.1.

η = 1 according to P100-3/2013 for the critical damping fraction of 5%.

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

- built area S = 587 sqm;
- building weight W = 906.4 to.;
- pillars area Pa = 5.41 sqm;
- seismic coefficient c = 1 x 0,2 x 2, 5 / 2,5 = 0.2;
- basic cutting force Fb = c x G = 0.2x906.4 = 181.3 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 pillars;

Checking of the vertical items:

$F_{head,pillars}$= 5.41 sqm x 35t/sqm = 189 to ;

- the ratio between seismic capacity and structural requirement

R‘3' Fhead/Fb -189/ 181 = 1

- The evaluation using the level 1 methodology shows a minimum structural insurance level of R3= 100%. This is higher than the value of 90% that places the construction into the seismic risk class Rs IV with the recommendation that no consolidation measures are necessary. The calculation was also made using the level 2 methodology. The snow load evaluation is carried out according to CR-1-1-3-2012. The characteristic snow load on the ground s_k=1.5 kN/m2. An importance-exposure factor γ=1 and a thermal coefficient Ct=1 are considered. The building is located in a complete exposure area, snow can be blown in all directions around the construction on flat land areas, there being no taller constructions. Ce= 0.8 is implemented. The shape coefficients for the uniform snow load for the roof are μ1 =0.8.
- Only a lighting system is provided at the roof level. The loads considered in the calculation at the roof sheet level are the following
- Additional frame weight: 0.4 kN/m^2
- Weight of terrace layers: 1.4 kN/m^2

A spatial model of the strength structure was created. The positive influence of the sandwiched masonry was considered in the model.

A verification of the main beam in the field in the fundamental group was carried out. This is reinforced at the bottom with 7Ѳ25 and 2Ѳ20. The capable moment is 1100 kNm and the effective one is approximately 1236 kNm. R3=1100/1236=0.89.
Regarding the seismic load, the moment at the support was evaluated Med=535 kNm. The capable moment of the beam is Mrd=450 kNm. The ratio R3=450/535=0.85.
It is observed that there are slight excesses of the bearing capacity in the fundamental group. In the seismic group, the moment at the end of the beam is 346 kN*m lower than the capable value and the moment in the field is 800 kN*m also lower than the capable value.

The effective bending moment at the columns is 350 kN*m and the capable moment is 263kN*m. R3=263/350=0.75.

For pillars in the seismic combination in the transverse direction the maximum shear force is 148 kN, considering the contribution of the masonry walls. The capacity of the concrete section to take up the shear force is

$$V_{Rd,c} = [C_{Rd,c} \cdot k \cdot (100 \cdot \rho_l \cdot f_{ck})^{1/3} + k_1 \cdot \sigma_{cp}] \cdot b_w \cdot d = [0.120 \cdot 1.54 \cdot (100 \cdot 0.0080 \cdot (16.66\ MPa))^{1/3}) + 0.150 \cdot (0.00\ MPa)] \cdot 0.350\ m \cdot 0.675\ m = 0.1037\ MN = 103.7\ kN$$

For the level 2 methodology, the insurance index of R3=103/123=0.83 obtained for the maximum shear force in the column is used.

Shear force resistance capacity of diaphragms in transverse direction.

Ved= 590 kN

The calculation is then performed using 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 redistributing the efforts. Taking into account the class 75 specified for bricks

fm=2.35x1.30=3.05 MPa and fvk0=0.20MPa

Unit design compressive strength: fd=3.05/1.2=2.54 MPa.

Unit characteristic shear strength fvd=fvm/(ymx CF). The average value of the shear strength capacity in the horizontal joint fvm is determined with the relation

fvm=1.33x(fvk0+0.4Ʊd)/(y_M x CF)

where Ʊd represents the design value of the normal unit stresses and y_M represents a partial safety coefficient, considered 2.3 for masonry built after the 1950s.

Unit design strength to failure on an inclined section (step fracture)

ftd=0.04 fm / (ymx CF)

The shear forces associated with failure by eccentric compression were calculated for both directions:

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

$\lambda_p = \frac{H_p}{l_w} =$ 0.46, represents the wall shape factor;

H_p, represents the wall height

l_w represents the wall length

$v_d = \frac{N_d}{t*l_w*f_d}$=0.067 represents a normalized unit stress that is calculated as the ratio between the unit stress perpendicular to the calculated joint and the design unit stress of the masonry in compression

The design values of shear breaking forces are also evaluated.

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

Strength to shear force when breaking by sliding in horizontal joint:

$$V_{f21} = \frac{1.33}{CF * \gamma_M} \left(f_{vk0} * \frac{l_{ad}}{lc} + 0.4\sigma_d\right) * t * l_c$$

=357.9 kN

l_c= 1,5 – 3 Md length of the compressed area of the section

Md = 4369kNm design bending moment

Nd =847 kN axial design force

$l_{ad} = 2l_c - l_w$ = 2,65 m, the length over which adhesion is active. If $l_{ad} \le 0$,

$$V_{f21} = \frac{0.53N_d}{CF*\gamma_M}$$

The value of the shear force for diagonal cracking is calculated with the formula:

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

=549.33 kN

b coefficient with values $1 \le b = \gamma p < 1,5$

In the previous calculation, the contribution of the confinement columns was not taken into account. It is observed that the minimum strength is that of sliding in the horizontal joint. Considering also the contribution of the concrete from the compressed column Vrsc=0.5*0.3*35t/sqm=52.5 kN and the strength of the reinforcement due to the mandrel effect Vrd2=0.1*804*300=24.12 . The shear force strength of the transverse wall is considered to be Vrd=52.5+24.12+357.9=434.52 kN.

In conclusion, the seismic insurance factor for the masonry wall is:

R3—434/590=0.73

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.

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. The detailed qualitative assessment is made by scoring in relation to the following 4 criteria:

1. *Conditions regarding the structure configuration*

• The structure has vertical continuity (the vertical elements are continuous up to the foundations)

• The structure is redundant

• The structure has similar strength and stiffness characteristics at all levels above the theoretical embedment level

• The structure has similar dimensions in plan at all levels above the theoretical embedment level; The building has a uniform distribution of masses vertically, at all levels above the theoretical embedment level (differences between the level masses are less than 30%); The structure is regular in plan, the overall torsional effects are moderate

• The structure has a proper infrastructure and is compatible with the foundation soil The quality of the concrete and steel complies with the provisions of P100-1

• The dimensions of the structural elements and their reinforcement allow the development of a plasticization mechanism with optimal seismic energy dissipation capacity

Moderate non-compliance 35 points. A reduction of 10 points is granted. the quality of materials and the detailing measures are not in accordance with the requirements of the codes in force

2. *Conditions regarding the structure interactions*

• The building items are separated by a joint large enough to prevent an uncontrolled interaction

• The intermediate floors (suppliers) are properly anchored to the main structure

• The interaction of the non-structural walls with the structure is controlled, does not cause significant degradation of them or of the adjacent structural elements and does not alter the type of the structure response as a whole

Moderate non-compliance 12 points. A reduction of 3 points is granted. There are masonry items poorly anchored to the construction.

3. Conditions for the composition of structural elements - Structural system in frames

• The pillars have long element proportions (the ratio between the height of the cross-section and the free height of the column is more than 3)

• The normalized average axial force in each pillar (calculated using the compressive strength of the concrete established according to 6.1, (11)) is less than 0.3

,

• Reinforcements and anchorages comply with the conditions of P 100-1

• Transverse reinforcement in columns and beams complies with the layout conditions provided by P100-1

• Longitudinal reinforcement in columns and beams complies with the layout conditions provided by P100-1

Moderate non-compliance 20 points. The reinforcement conditions of the current standards regarding short pillars on longitudinal direction are not complied with

4. *Conditions relating to floors*

• prefabricated precast slab with overcasting of min 80 mm thickness

• the floor structure allows it to fulfill the role of a rigid horizontal diaphragm and resistant to actions in its plan.

Criterion met 10 points.

The result of the detailed qualitative analysis related to the composition criteria is quantified by the indicator R1 = Σ pi1-4 where pi are the points awarded to each criterion. Total score achieved R1=77*0.8=62 points.

According to chapter 8.1.1. of code P100-3/2019, for buildings with the level offulfillment of the seismic structure conditions, R1 between 60-90, 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 degradations caused by seismic action and other causes, is established based on the criteria in annex B, page B3 of code P100-3/2019.

1. Degradation caused by the Earthquake Action *There are no obvious degradations caused by the earthquake action sustained by the building.*	50 pts.
2. Degradation caused by vertical loads, including seismic loads, in structural or non-structural elements. No obvious degradation caused by vertical loads.	15 pts.
3. Degradations caused by the shear test: *No degradations caused by deformation loading are detected*	8 pts.
4. Degradation caused by defective execution *Moderate non-fulfillment. There is peeling plaster on the walls and base, there is some infiltration through the roof. There is condensation damage on the window sills.*	5 pts.
5. Degradation caused by Environmental Factors over the concrete or steel reinforcement. *Moderate non-compliance. A reduction of 5 pts is considered. There are areas where the plasters are affected by moisture*	5 pts.
6. Degradation caused by the users *There are some local degradations due to repeated hitting, a deduction of 3 points is considered*	4 pts.
Total	0.8x87=70pts.

According to chapter 8.1.1. of code P100-3/2019, for buildings with a structural damage level marked with R2 between 70-90, the buildings can be classified into seismic risk class RsIII..

2.10 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 62 pts., falling into the seismic risk class RsIII.

Following the qualitative assessment of the level of structural damage R2, the structure obtained 70 pts., corresponding to the seismic risk class RsIII.

The assessment using the level 1 methodology indicates a minimum structural insurance level R3= 73%. This is located 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, 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.

2.11 Proposals for intervention

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

-- 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.
-- for the air conditioning system of the gym hall, an aggregate weighing approx. 1.2 tons is required to be mounted on the roof. A pipe on the aggregate footprint will pierce the roof. We propose that the aggregate be located in an area towards the longitudinal wall where 6 strips with gaps of 0.60m wide will be carefully removed. In the middle of the area, the aggregate will be mounted resting on a yoke of metal beams supported and anchored on the transverse beams in the basement. Around the piercing, the uncovered area will be braced to achieve continuity of the roof washer and then it will be hydrothermally insulated using a sheet metal support.
- the windows of the gym hall located towards the end tympanums between the elevation
+3.90 and +9.05m can be blocked. The closure of these windows is done with masonry with vertical gaps that will be reinforced in the horizontal joint at 2 seats with two ϴ8 bars anchored in the pillars adjacent to the window.
-- the masonry wall in axis 1, between the thermal power plant and the gym hall warehouse, will be rebuilt. This will be built in strips with the current wall or a reinforced concrete core will be provided to ensure the cooperation of the new wall with the current one. The external walls of the thermal power plant that were built after the initial construction will be dismantled, according to the architectural proposal. The dismantling will be done by breaking the walls, taking care not to affect the remaining resistance structure.

3 **Conclusions**

3.1. The Gym Hall building, with a height regime Gf located within the Technical Energy College, str. Energeticienîlor, no. 1, Sibiu Mun, Sibiu county, is made of a single section. It is functionally divided into the gym hall area and the annexes, locker rooms and storage room. The building was designed based on a standard project drawn up in 1967 by I.P.C.T., adapted to the site in 1971 by Electromontaj Trust and was built in the immediate following period.

3.2. Building Gf is designed as a building which lateral rigidity is assured by an orthogonal system of reinforced concrete frames that collaborate with an orthogonal system of masonry diaphragms, being structured with an opening of 15.3 m for the sports hall and 4.1 m for the annex area. The spans are 3.6m.

3.3. Building Gf 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 P10O-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).

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.
3.6. For the installation of the air conditioning unit on the roof, 6 strips with gaps will be removed, a metal yoke will be installed, and the area will be braced to ensure the continuity of the roof washer.
3.7. For the thermal insulation of the roof, considering the existing load-bearing capacity, the existing waterproofing and thermal insulation layers at the roof level will be removed.
3.8. The masonry wall in axis 1 will be rebuilt, achieving the collaboration between the new and existing wall. The marked walls of the thermal power plant from the proposed plan of the thermal power plant will be dismantled.

3.9. Other recommendations:
The work 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.

3.11. Under the conditions described in this expert report, the thermal refurbishment works for the Gym Hall 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	03.2025
	Illegible signature, Official stamp

Attached:

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

Technical expert report
for the site: *Gym Hall within Technical Energy College, Electricienilor Street, no. 1, Sibiu Mun, Sibiu county*

Photo 1 – Main entrance. Some infiltrations can be observed on the Annex socket

Photo 2 – Main entrance. Improper pipe

Photo 3 – Main entrance – damaged pipe

Photo 4 – Locker rooms – in the right side one can see a main pillar

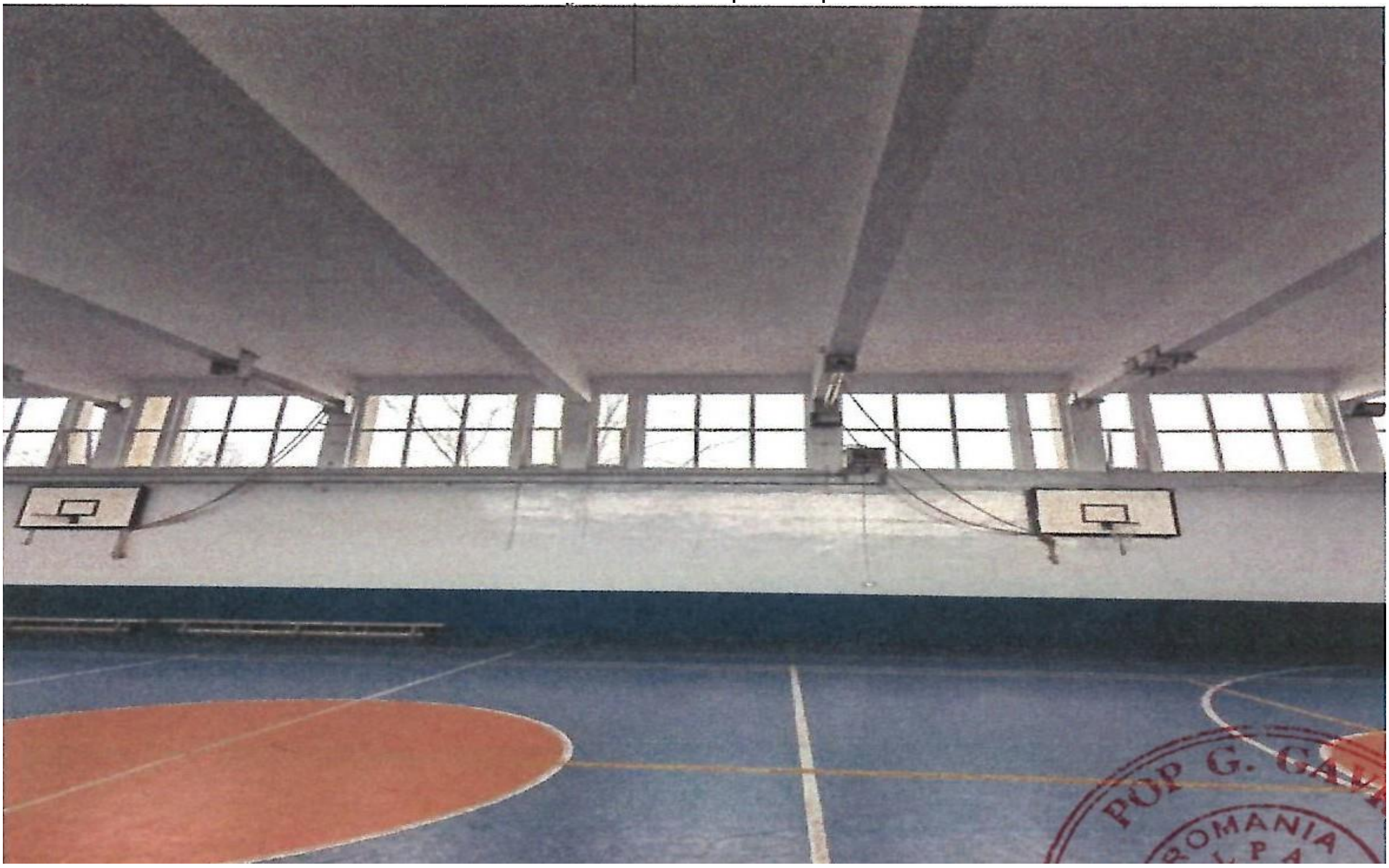

Photo 5 – Viewing from inside the gym hall, one can detect the main beams, the pillars and the longitudinal wall from N limit

Photo 6 – Photo from inside the gym hall, one can see the beams with variable height, the main pillars and the side wall made of masonry

Photo 7 – Longitudinal wall with its entrance from the north side. One can see that the pavement detached itself from the construction and does not provide the removal of rainwater from the building.

Photo 8 – Transversal right wall. One can see a wetting of the wall in the lower side, most probably due to the pavement with reverse slope.

Photo 9 – Degradations of the concrete terrace plaster over the terrace.

Photo 10 – Photo of the heating system and of the new roof with wooc … on the annex roof of the gym hall

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