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Technical expertise report
- strength structure -

- Bucharest, October 2017 -

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1. OBJECT OF THE TECHNICAL EXPERTISE

The object of the technical expertise is the palace of former Dacia insurance company, whose main office was located in Bucharest, 18-20 Lipscani St., district 3.

2. PURPOSE OF THE TECHNICAL EXPERTISE

This technical expertise has the following purposes:
- to evaluate the seismic performance of the current building;
- to substantiate and make proposals for the decision to intervene in order to reduce seismic risk and to address the other categories of damage.

3. BENEFICIARY OF THE TECHNICAL EXPERTISE

This report of technical expertise was ordered by the "ELIE WIESEL" National Institute for the Study of the Holocaust in Romania, based in Bucharest, 89 Dacia Blvd, district 2, as beneficiary.

4. BASIS OF THE TECHNICAL EXPERTISE

4.1 Legal basis for drafting the technical expertise

This expertise report is drafted on the basis of the following legal provisions:

A. Law no. 10/1995 – the Law on Quality in Constructions and Law. 177/2015 amending and supplementing Law no. 10/1995 on quality in constructions.

Art. 18 of this law states that:

"(2) Interventions to the existing constructions refer to works of construction, reconstruction, temporary support of damaged elements, partial demolition, reinforcing, repairs, changes, expansion, heat insulation, increasing energy efficiency, major or complex renovation, as appropriate, change of use, protection, restoration, preservation, total demolition. These are to be done on the basis of a technical expertise report drafted by a certified technical expert and, where appropriate, based on an energy audit prepared by a certified energy auditor for buildings, including the design, execution and acceptance of works that require, under the law, the issuance of a building or demolition permit, as appropriate. Works on existing buildings must be recorded in the technical registry of the building."

B. Government Ordinance no. 20/1994 on measures to reduce the seismic risk of buildings, republished in 2007, with its later amendments. Art. 2 of the ordinance provides that:

"(1) Building owners, individuals or legal persons and associations of owners, as well as legal persons who have manage buildings will act in order to:

a) track the technical behavior of the owned or used constructions that this ordinance refers to;

b) order the technical expertise report of the building, drafted by certified technical experts, in accordance with the technical regulations;

c) approve the decision to intervene and continue works, in accordance with the conclusions of the technical expertise report.

(1^1) The heads of public institutions, as defined by Law 500/2002 on public finances, as amended and supplemented, and by Law 273/2006 on local public finances, as amended and supplemented, including the owners or managers of the constructions of public interest and utility, will give precedence to:

a) identifying owned or managed buildings, erected before the entry into force of Norm P100-78 on anti-seismic design, and which are located in localities where the peak ground acceleration a_g, according to the Romanian territory zoning map in the P100-1 Code of Seismic Design is greater than or equal to 0.16g;

b) ordering the mandatory technical expertise report required under letter a);

c) notifying local authorities and the county committees, and the Bucharest emergency committee, respectively, about buildings that were identified, in accordance with point a), after having been subjected to a technical expertise report, as belonging to class I of seismic risk, by a technical expert in his or her report.

(1^2) The provisions of paragraph (1^1) shall also be complied with accordingly by the other owners or managers of buildings defined as being of public interest or utility, for the purposes of this Ordinance.

(2) The owners and, where appropriate, administrators of public venues having another use, located at the ground floor and, if this is the case, in the basement and/or other levels of multistoried buildings, having more than GF + 3 floors, built before 1978, are obliged to act proportionately, jointly with the owners of the abodes and with the owners' association, in order to get the technical assessment report on the strength structure of the whole building, within two years of receipt of the notification referred to in art. 4 par. (4) b).

(3) For this Ordinance, the phrase "public venues having another use" refers to spaces made for carrying out activities that involve crowds of people, such as theaters, exhibition halls, reading halls, spaces for trade, tourism, accommodation facilities and catering services, health and social care, public administration and the like, no matter if these spaces are the result of the initial design of the building or, where appropriate, they are the result of later arrangements.

(4) For buildings where a technical expertise was performed and they were listed as belonging to class I of seismic risk, the owners of the buildings, natural or legal persons, associations of owners, legal entities that manage the building and heads of public institutions, as well as any other type of persons who are in the possession of buildings of public interest and utility, must comply with the following:

a) to order the design of interventions to be performed by certified natural or legal persons and to order the verification of the projects by certified technical staff, within two years from the date when the building has been listed in class I of seismic risk, after the technical expertise was performed;

b) to order the execution of the interventions by authorized legal persons who employ certified technical staff for such works, as well as to follow-up, check and approve the execution of the interventions by employing certified site inspectors, within two years of the completion of the reinforcing project. "

C. Government Ordinance no. 925/20 of November 1995, for the approval of the regulation on the quality of technical expertise and verification of projects, works and construction. Art. 15 of the Regulation provides that:

"... This activity is carried out by certified technical experts on quality, when a legal ruling or a state body entitled to check the quality of constructions provides for it, or when it is required by a particular situation, in order to:

a) solve improper situations that may occur in existing buildings:

- respond in case of disasters or accidents caused by natural phenomena, human actions or technological activity;

- determine, at any stage, the technical condition of the building in order to assess its capability to fulfill the requirements, under the law;

b) solve disputes concerning the technical quality of projects or of the execution of construction works."

Art. 16 of the above-mentioned regulation provides that:

"If the certified technical expert rightly concludes that immediate action is required (for the support, insulation or partial evacuation of the building) to prevent accidents with serious consequences - casualties or damage - building owners or managers, as well as the investor, where appropriate, will be sent a written notice and they have the obligation to perform such works."

The works requested by the beneficiary for the seismic performance evaluation of the Palace of the former Dacia insurance company, on the building located in Bucharest, 18-20 Lipscani St., district 3, must comply with these provisions.

4.2 Assumptions and limiting conditions

At the core of the technical expertise, there are a series of assumptions and limiting conditions, presented below. The Technical Expert’s opinion is expressed in

accordance with these assumptions and conditions, as well as with the other considerations in this report.

Hypotheses

The expert considers that the assumptions made in the implementation of the quality checking methods pertaining to these works were reasonable, in light of the facts that are known at the date of this report.

When drafting the work, we took into account all factors that influence the quality of executed works, by using only the available information and not deliberately omitting any of them. There may be other information that the expert was unaware of at the date of the report. As far as the expert knows, all available information is accurate.

The building was seen and inspected personally by the expert.

The expert presented descriptive elements in his report, in order to provide the clearest possible picture of the real status of the building.

The expert will not be held responsible for the existence of hidden defects of the building and/or environmental factors that may influence the technical or economic condition of the building and, therefore, he can't provide any guarantee, in this respect.

The expert did not inspect those parts of the building that are covered or inaccessible.

The expert obtained information and opinions that were introduced in this report from sources that he deems credible. He assumes no liability for the data provided by the beneficiary of this report and by third parties.

The expert has no interest, now or in future, as far as the beneficiary of this report is concerned, or as far as other persons, who are mentioned in this report, are concerned.

The expert assumes full responsibility for the opinions he expressed in this report.

Limiting conditions

The possession of a copy of this report does not entail the right to publish it.

The expert, given the nature of his work, is not required to provide further advice or to testify in a court of law, in relation to the report, unless such agreements were concluded in advance.

This report or parts thereof should not be published or made public without the prior agreement of the expert.

4.3 Date of Inspection

The inspection was carried out on Thursday - August 10, 2017, Friday - August 11, 2017, on Friday - August 25, 2017 and on Thursday - September 28, 2017.

He did not conduct investigations on the possible contamination of buildings, land or neighboring sites and the hidden parts of the building have not been inspected and subjected to the expertise.

4.4 Responsibility towards third parties

The expert's report is confidential, intended only and solely for the purpose stated beneficiary referred to in Chapter 3 of this technical expertise. The expert does not accept any responsibility for another person (if the report is sent to another person) or for the stated purpose or for other purposes, in any circumstance.

4.5 Documentation used for the preparation of the technical expertise

For the preparation of the technical expertise, we used the following documents:

1. Architectural plan, issued by the SACO CONSTRUCT SRL company In August 2017.
2. Test of materials reports no. 976/18.09.2017 and no. 977/08.18.2017, issued by the INSTAL TEST SRL company.
3. Test of materials reports no. 145 P2/09.06.2017 and no. P2 146/09.06.2017, issued by the CENTRAL LABORATORY SA company.
4. Geotechnical study prepared by PFA Dimofte Mihai, in September 2017.
5. Historical study made by the CRINDESIGN PROJECT SRL company in November 2016.
6. The technical registry of the construction - general information, approvals and memos.
7. Project on architecture and strength no. 1260/1978, prepared by the "Carpați" Institute of Design.
8. Project no. 145/2002, issued by the REMON PROJECT SRL company.
9. Project no. 278/2008, issued by the ART PROJECT ION SRL company.
10. Information on the history of the site, performed construction works, physical state of the building, etc., provided by the beneficiary.

These documents are thematic data, ordered for the purposes of this technical expertise report, and their accuracy is the responsibility of the respective developers.

Later modifications of thematic data entail reviewing and possibly changing the conclusions and proposals of this report, as appropriate.

4.6 Non-disclosure clauses

The expertise report or any reference to it cannot be published or included in a document for publication without the prior written agreement of the expert, after specifying the form and context in which it will be published.

The full or partial publication and use thereof, by other persons than those referred to in Chapter 3 of this technical expertise, will lead to the termination of all contractual obligations.

5. HISTORICAL DATA ON THE CONSTRUCTION PERIOD AND THE LEVEL OF IMPLEMENTED DESIGN REGULATIONS

The building was erected at the end of the 19th century.

The construction was built on the basis of the technical knowledge and technological procedures that were specific to that age. The construction was not erected on a project basis. The constructive system of the building is strictly "gravitational" without any seismic protection measures. The composition and strength structure of the building do not take into account anti-seismic design principles.

The building suffered some damage throughout its existence, mainly as a result of seismic actions.

Project no. 1260/1978, prepared by the "Carpați" Institute of Design, states:

...

The central hall has an architecture that was preserved properly; nevertheless, the area of the stairs, with four ramps with plaster decorations, is less preserved; apart from a few plaster adornments, at the round corner towards Smârdan Street, where the building has an oval hall, on two floors, the rest of the building does not have interior decorations anymore.

...

The building underwent many changes, given the different functions it had over the years, such as clay compartments or makeshift arrangements in the attic.

During its existence, the building has undergone several repair and consolidation works (in the 1980s).

Project no. 1260/1978, prepared by the “Carpați” Institute of Design, proposed the rehabilitation of the building.

The main works were entailed by the rehabilitation of the building for its new functions:

- setting the heating unit in the basement;

- Rebuilding stairway no. 1, between the ground and first floor, also changing the direction of ascent;

- Building stairways no. 2 and 4;

- Full restoration of stairway 3 and mounting an elevator, nearby;

- Placing a reinforced concrete ceiling in the area of the restaurant, at the level of the ground floor ceiling (in order to obtain space for the presentation hall);

- Building four large areas adjoining the central hall, both on the ground and first floors;

- building the stairway no. 5 and 7 for access to the basement;

- Making way to empty spaces for circulation;

- Mounting the elevator for materials, from the basement to the ground floor;

- Making a walkway at the floor over the ground floor.

Apart from the already mentioned works, which are necessary for the new functions, it is necessary to make reinforcing works, given the absence of bearing capacity in the case of some of the elements of the building to restore the building at strength level for horizontal loads as it was before the earthquake of March 4, 1977.

Project no. 145/2002, issued by the REMON PROJECT SRL company, proposed rehabilitation works of the BCR – Lipscani headquarters (former headquarters of the Arpimex), Bucharest.

For these work, building permit no. 77 dated June 17, 2002 was issued by the Bucharest City Hall, with the following specifications:

... it will be repaired and arranged, for the use of "bank" office, without affecting the architectural character of representative interior spaces, based on the design provided in the technical expertise performed by Eng. Sevcenco Valentin, a technical expert certified by MLPAT, as follows:

- arranging the spaces for the treasury and the room before the treasury (in the basement);

- brickwork compartments (in the basement);

- closing empty spaces where doors and windows used to be, as well as making new empty spaces for doors, in the existing brickwork (the empty spaces will be reinforced);

- compartmentation of the space by using light plasterboard walls;

- restoration of the finishes at the walls, floors and ceilings, including the retouch and cleaning of decorative elements;

- restoring or replacing interior installations;

- retouching the exterior woodwork;

- retouching the wooden roof structure and replacing the tin covering, but maintaining the same architectural look;

- repairs at the exterior plasterwork and finishing the façade without changing the original color;

- providing an installation of outdoor lighting, so as to make the construction more visible.

The project no. 278/2008, issued by the ART PROJECT ION SRL company, proposed the following works:

a) Demolitions, removal of elements:

- Removing the interior woodwork: windows and doors made of PVC (in the area of the cashier's office), interior doors made of wood.

- Partial removal of the floor tiles and carpet.

- Demolition of existing compartmentation walls (as described in PI 2AR/D).

- Removal of the current false ceiling.

b) New works:

The arrangement of the area reserved for the Branch will use light walls made of plaster on a metal structure and secured glass walls that they will not entail important additional weight, so that it will not affect the building's strength structure in any way.

The memo pertaining to the strength, part of the above-mentioned project, makes the following clarifications:

The refitting of the BCR venue includes:

Interior compartmentation by using plasterboard walls that do not require major demolition works.

Replacing the interior woodwork.

New interior finishes of the floors, walls and ceilings.

Adapting the existing interior installations to the new spatial configuration.

These fitting works have no negative impact - local or general – on the behavior of the existing structure of the building, as far as the gravitational and/or seismic loads are concerned.

For these works, building permit no. 94/871167 dated December 24, 2009, issued by the Bucharest City Hall, was obtained. It has the following specifications:

The required interventions refer to works on the spaces located on the ground floor and basement: removal of the interior woodwork and PVC, local removal of the floor tiles and carpet, removal of compartmentation walls, local removal of the false ceiling, re-compartmentation, local rehabilitation of the interior finishes, restoring utility installations.

Measures will be made to protect, repair, preserve and restore existing decorative elements of the walls and ceiling, as well as valuable elements of the floors.

6. DESCRIPTION OF THE SITE

6.1 Legal System

The property subjected to this technical expertise is located in Bucharest, 18-20 Lipscani St., district 3. It is partially managed by the "Elie Wiesel"National Institute for the Study of the Holocaust in Romania (~ 76%). This is the future venue of the History Museum of the Jews in Romania.

On the right side of the building – looking at the building from Lipscani St. (about 24% of the conducted area of the building: partially, at the ground floor - 725 m^2 and the basement - 1190 m^2) a subsidiary of CEC Bank operates.

The building is identified by Land Registry entry no. 205216 and 205197, appearing in the land registry at no. 33120 and 32625_1, respectively, at the Cadaster and Land Title office of District 3.

The building is included in the List of Historical Monuments of Bucharest, code LMI 2015-B-II-m-A-19021, the Palace of the former Dacia – Romana insurance company, 18-20 Lipscani St, District 3 Bucharest, according to the order of the Ministry of Culture and National Heritage no. 2.828/2015 amending Addenda 1 of the order of the Ministry of Culture and Religious Affairs no. 2.314/2004, that approves the updated List of Historical Monuments and the List of Historical Monuments that are gone, dated December 24, 2015. The code has the following meaning:

- B - Bucharest;
- II - architecture;
- m - monument
- A - monuments of national interest;
- 19021 – entry no. on the list.

6.2 Topography of the site

The building is located in Bucharest, at 18-20 Lipscani St., district 3, and is composed of a plot of land and a building. The Palace of former Dacia insurance company has a height of S + P + 2E (Basement + Groung Floor + 2 Floors).

The land has an irregular shape (triangular), with the approximate maximum dimensions of 95.55 m x 35.30 m and has a triple opening: Lipscani St. (89.55 m), Stavropoleos St. (79.93) and Smârdan St. (17.77 m). The land area is A_T = 2151.67 m^2. The plot is on a slope, the maximum difference being of 1.26 m (the

sidewalk level on Lipscani St. varies between +79.82 m and +79.87 m, while the level of the sidewalk on Stavropoleos street varies between +78.61 m and +79.75 m).

The building is located near the following:

- to the northern side, at a length of 89.55 m, Lipscani St.;
- to the southern side, at a length of 79.93 m, Stavropoleos St.;
- to the eastern side, at a length of 17.77 m, Smârdan St.;
- to the western side, at a length of 37.70 m, the building at 16 Lipscani St., consisting of land and construction (the National Bank of Romania), with a blind wall towards the property at 18-20 Lipscani St.; The two buildings are separated by a filled area whose dimensions are unknown.

6.3 Site features

The site is characterized by the following data:

Earthquake (under norm P100-1/2006 and norm P100-3/2008)

- Acceleration of the land under the design (for the horizontal component of the land acceleration) - a_g = 0,24g = 2,36 ms^{-2} for the average recurrence time of earthquakes IMR = 100 years - Bucharest, Figure 3.1 and Table A.6 - norm P100-1/2006
- values of the control periods (corner) - T_B = 0,16 s, T_c = 1,6 s, T_D = 2,0 s - Bucharest, Figure 3.2 and Table A.6 – norm P100-1/2006
- the maximum dynamic amplification factor of the horizontal acceleration of the land, by the structure, with the fraction of critical absorption ξ = 0.05 - β_0 2.75 – Bucharest, Figure 3.3 - norm P100-1/2006
- behavior factor: - q = 1.5 - simple brickwork/non-reinforced building structure ZNA (a global behavior factor of the structure was opted for) - Table 6.1, norm P100-3/2008, and Table 8.4, norm P100-1/2006
- class of importance and exposure to earthquake - II γ_I = 1.2 Table 4.2 - norm P100-1/2006
- the elastic response spectrum of absolute accelerations for the horizontal elements of the movement of the land on the site, $S_e(T)$ (in m/s^2) is defined as:

$$S_e(T) = a_g \beta(T)$$

where the value of a_g is given in m/s^2, and β (T) is the normalized elastic response spectrum of the absolute accelerations - norm P100-1/2006:

$$0 \le T \le T_B \quad \beta(T) = 1 + \frac{(\beta_0 - 1)}{T_B} T = 1 + 10{,}94T$$

$$T_B \le T \le T_C \quad \beta(T) = \beta_0 = 2{,}75$$

$$T_C \le T \le T_D \qquad \beta(T) = \beta_0 \frac{T_C}{T} = \frac{4,4}{T}$$

$$T_D < T \qquad \beta(T) = \beta_0 \frac{T_C T_D}{T^2} = \frac{8,8}{T^2}$$

- the design spectrum for the horizontal components of land movement $S_d(T)$ (given in m/s^2) is the inelastic response spectrum of absolute accelerations defined by the equations – norm P100-1/2006:

$$0 \le T \le T_B \qquad S_d(T) = a_g \left[1 + \frac{\left(\frac{\beta_0}{q} - 1 \right)}{T_B} T \right] \eta = 2,36(1 + 5,21T) \times 0,88 = 2,08(1 + 5,21T)$$

$$T_B \le T \le T_C \qquad S_d(T) = a_g \frac{\beta(T)}{q} \eta = a_g \frac{\beta_0}{q} \eta = 4,32 \times 0,88 = 3,80$$

$$T_C \le T \le T_D \qquad S_d(T) = a_g \frac{\beta(T)}{q} \eta = a_g \frac{\beta_0}{q} \frac{T_C}{T} \eta = \frac{6,91}{T} \times 0,88 = \frac{6,08}{T}$$

$$T_D < T \qquad S_d(T) = a_g \frac{\beta(T)}{q} \eta = a_g \frac{\beta_0}{q} \frac{T_C T_D}{T^2} \eta = \frac{13,82}{T^2} \times 0,88 = \frac{12,16}{T^2}$$

The equations above, for the design spectrum, are in accordance with P100-1/2006, art. 8.4, which states: *The seismic calculations for buildings having structural walls made of brick will be made according to the principles and general rules of this Code, including the specific explanations given below*.

The elastic response spectrum will be calculated by using equation (A. 7.1.) In P100/1-2006:

$$S_e(T)_{\xi \neq 5\%} = S_e(T)_{\xi = 5\%} \eta$$

where:

$S_e(T)_{\xi = 5\%}$ - the elastic response spectrum for land acceleration components at the site, corresponding to the fraction of the conventional critical absorption, ξ = 5%;

$S_e(T)_{\xi \neq 5\%}$ - the elastic response spectrum for land acceleration components at the site, corresponding to another fraction of critical absorption, $\xi \neq 5\%$;

η - the correction factor that takes absorption into account, determined by the following equation:

$$\eta = \sqrt{\frac{10}{5+\xi}} \geq 0{,}55$$

The correction factor resulted from the fraction above (A.7.2 of P100-1/2006) will be considered η = 0.88, corresponding to the fraction of critical absorption ξ = 8%.

Snow (under CR 1-1-3-2012)

- the characteristic value of snow load on the ground: s_k = 2,0 kN/m^2 - Bucharest, Figure 3.1 and Table A.1
- Class of importance-exposure for snow action: II, γ_{is} = 1.10 - Table 4.1
- The shape coefficient for snow load on the roof: μ_i = 0.8 - 5.1 Table (0 ° < α_{max} = 25 ° <30 °)
- exposure coefficient of the building site: C_e = 1.0 (normal exposure) Table 4.2
- thermal coefficient: C_t = 1.0

Wind (Under CR 1-1-4-2012)

- reference value of the dynamic wind pressure: q_b = 0,50 kN/m^2 - Bucharest, Figure 2.1 and Table A.1
- class of importance-exposure for wind action: IIγ_{iw} = 1.15 - Table 3.1
- exposure factor at the height z above the land:
  * $c_e(z) = c_{pq}(z)c_r^2(z)$ = 1,67 - pentru z_{min}= 10 m < z = 27,0 m < z_{max} = 200 m
- wind pressure coefficient c_p = 0,7 şi c_p = 0,8
- suction drag coefficient c_p = 0,3, c_p = 0,5, c_p = 0,8 and c_p = 1,2.

Foundation soil (under the geotechnical study prepared by PFA Dimofte Mihai in September 2017):

- stratification of the land (relative measurements compared to the natural ground level):
  ± 0.00 m ÷ -2.90 m - layer of filling land with fragments of bricks and traces of coal;
  -3.90 -2.90 m ÷ m - layer of gray-brown silty clay, having a plastic consistency;
  -6.00 -3.90 m ÷ m - layer of averagely thick, gray – yellow sand layer (with small-average gritstones at a depth of -6.50);
- hydrostatic level: ground water was not met at the investigated depth (-6.00 m from ground level); given the information in the archive and in the existing wells in the vicinity, it seems that ground water is encountered at an approximate depth of 7.30 m ÷ 7.40 m, based on the systematized ground level. It has a vertical fluctuation of approx. 1.00 m, at times of heavy rainfall and for a long term; the water has a weakly carbonic aggression against the concrete, and a strong aggression against

metals, as shown by samples, under I 14-76; according to NE 012-1/2007, the water falls into class XA1 (slightly aggressive chemical environment);

- freezing depth: 0.80 m 0.90 m ÷ according to STAS 6054/77;
- the land which is proper for foundations is made of the layers of sand and gravel, of an average density, followed by the layer of clay – dust, semi-consolidated ground, having an average level of compressibility;
- conventional pressure: 250 kPa (2.50 daN/cm^2).

7. CLASSIFICATION OF THE BUILDING AND ITS CATEGORIES OF IMPORTANCE

For the purpose of assessing the human and economic consequences of a major natural and/or anthropic hazard, as well as their role in the post-hazard response of the society, the building falls into the class of importance-exposure II - constructions posing a major threat to public safety in case of crash or serious damage (under the "Design Code. Basics of building design" call letter CR 0-2012, Addendum A1).

For the purpose of assessing the level of earthquake protection of the construction, the building falls into the class of importance II - Buildings whose seismic strength is important in terms of consequences associated with its collapse or serious damage (under the "Code of seismic design - Part I – Design provisions for buildings "call letter P100-1/2006, table 4.2).

For the purpose of assessing snow action on the construction, the building falls into the class of importance-exposure II - construction which presents a major threat to public safety in case of crash or serious damaged (under the "Design Code. Evaluation of snow action on buildings" call letter CR 1-1-3 - 2012 table 4.1).

For the purpose of assessing the effect of wind on buildings, the building falls into the class of importance-exposure II - construction which presents a major threat to public safety in case of crash or serious damaged (under "Design Code. The assessment of wind action on buildings" call letter CR 1-1-4 - 2012 table 3.1).

For the purpose of assessing the designed lifespan of the building’s structure, the construction falls into the structural class S5 – structures for monumental buildings and major civil engineering constructions with a lifespan ≥100 years (under "Design Code. Basics of Building Design" call letter CR 0-2012, Table 2.1).

For the purpose of applying a differentiated quality system in constructions, the building falls into the category of importance B - especially important constructions (under GD 766/1997, Addendum 3).

For the purpose of assessing the exposure level of the building, to the environment, (under the Norm for concrete production and production of concrete, reinforced concrete and pre-compressed concrete. Part 1: Production of concrete, Call letter NE 012/1-2007 and Code of practice for the production of concrete, call

letter CP 012/1-2007), buildings that have the following exposure classes: XC1 (superstructure – at the interior) XC4 (superstructure – at the exterior) and XC2 (infrastructure).

For the purpose of assessing the exposure of the building, to the environment, (under the "Design code for masonry structures", call letter CR 6-2013, Art. 4.3.2.1 (3)), the building falls within the following exposure classes: MX1 (superstructure - on the inside) and MX3 (superstructure - on the outside).

8. DESCRIPTION OF THE CONSTRUCTION IN TERMS OF FUNCTIONALITY, ARCHITECTURE AND INSTALLATIONS

The asset is located in Bucharest, 18-20 Lipscani St., district 3, and is composed of a plot of land and a building.

According to the layout, the building has an irregular shape, with the maximum dimensions of 95.30 m x 35.55 m. The total built area is A_c = 2137,0 m^2. The spread area is A_d = 7973,0 m^2.

The height standard of the building is basement (h = 3.86 m), ground floor (h = 4.55 m), 1st floor (h = 4.30 m) and 2nd floor (h = 4.15 m).

The maximum height of the building is h_{max} = 25,65 m (from the ± 0.00 level of the ground floor) and h_{max} = 25,74 m ÷ 27,00 m (from the CTS), respectively.

The building consists of one section. On the right side, the building is attached to the building whose address is 16 Lipscani St. (looking at the building from Lipscani St.) and is free on the rest of the sides. The two buildings are separated from each other by a filling area whose dimensions are unknown.

Access to the building is made through thirteen doors (six located on Lipscani St. seven located on Stavropoleos St.).

From a functional perspective, the building can be used as museum and a bank. Currently, the building is partially used and maintained properly, except for the unused space.

From the architectural point of view, the construction is in a satisfactory state. On the front, the plaster presents small areas with fissures, cracks, stains of moisture (dried out at the time of the inspection), exfoliations and detached elements. On the inside, the building also shows, in small areas (in particular in the unused spaces, especially in the basement), fissures, cracks, stains of moisture (dried out at the time of the inspection) and the plaster was exfoliated and peeled off, at the walls and ceiling.

The roof, having an attic where people can enter, is made of a wooden structure and tin sheet, being in a relatively good state of repair. On a small area, the

roof is a terrace where people cannot enter and consists of a reinforced concrete floor.

The enclosures are made of full brick, having a thickness of 560 mm, 420 mm and 280 mm (without plaster). The outside windows is made of wood, PVC and metal.

Compartmentations are made in the walls of the full brick with a thickness of 700 mm, 560 mm, 420 mm, 280 mm and 140 mm (without plaster). The interior framework is made of wood, PVC and metal.

Vertical circulation is assured by seven reinforced concrete stairways and three elevators.

The building is equipped with the water-sewerage systems, electric lighting and sockets, low power installations, heating and gas installations.

The building is included in the List of Historical Monuments in Bucharest, code LMI 2015-B-II-mA-19021, the Palace of the former Dacia insurance company - 18-20 Lipscani St., district 3 Bucharest, under the order of the Ministry of Culture and National Heritage no. 2.828/2015 that amends Addendum no. 1, under the order of the Ministry of Culture and Religious Affairs no. 2.314/2004 on approving the List of Historical Monuments, updated, and the List of Historical Monuments that were Lost, with later amendments, dated December 24, 2015.

9. DESCRIPTION OF THE CONSTRUCTION IN TERMS OF ITS STRUCTURE

The building consists of one section. On the right side, the building is attached to the building whose address is 16 Lipscani St. (looking at the building from Lipscani St.) and is free on the rest of the sides. The two buildings are separated from each other by a filling area whose dimensions are unknown.

The foundations were identified as a result of the two probes taken during the geotechnical study prepared by PFA Dimofte Mihai in September 2017. They are made of brick and are "continuous". The width of the foundation has at least 600 mm (approximately equal to the width of the walls). The height of the foundation has ~ 800 mm. The depth of the foundation is -4,70 m (from the floor level of the ground floor ± 0.00) or -0.80 (from the finite level of the basement), into the layer of sand with gravel, in an average state of density, followed by the package of clay – dust, semi-consolidated ground that has an average density.

The geotechnical study prepared by the PFA Dimofte Mihai, in September 2017, makes the following clarifications:

The foundation at the site (Section Basement + Ground Floor + 2 Floors), made of brick, was made directly, from the minimum depth of -4.50 m (from ground level), on continuous plans, on supported plans and on a bed of bricks having a

thickness of 0.50 m in the area close to the Stavropoleos St. (see removal D1/2017 and sections and photos of the land, in the area of the existing basement). We consider that, in order to avoid a foundation in steps, caused by the difference in height between Lipscani St. (79.83 CT) and Stavropoleos St. (79.41 CT) and in order to build the foundation on the same type of layer, designers used (in part) a layer of bricks, so as to no longer have a level difference. This way, the vertical foundations have the same level and thickness, on one façade (Lipscani St.), as well as on the other (Stavropoleos St.).

The basement is made of load-bearing, simple/not-reinforced (ZNA) masonry walls. The exterior walls have a thickness of 560 mm (without the plasterwork) and the interior walls have thickness of 700 mm, 560 mm, 420 mm and 280 mm (without the plasterwork). The floor of the basement is made up of brick bolts (140 mm) and type "I" metal profiles (laminated profiles I 200, I 220, 2I 220, I 260, I 300 and I 360/1650 mm ÷ 2450 mm – distance between girders) and of arches of brickwork.

According to the strength design no. 1260/1978, prepared by the "Carpați" Institute of Design, the supporting structure the basement was subjected to the following works:

- total or partial demolition of structural and non-structural walls of brick, for the re-compartmentation of the area;
- partial demolition of the ceilings (in the area of the new stairways and of the ceilings that were replaced by concrete ones);
- partial or total demolition of the stairs;
- partial or total demolition empty spaces in the brick walls;
- vertical elements made of reinforced concrete - walls and veneers of the brickwork walls (stairway no. 3, stairway no. 4, three elevators - two of them from the basement to the second floor and one for freight, from the ground floor to the basement);
- horizontal reinforced concrete elements - floors (stairway no. 3, stairway no. 4, stairway no. 5, stairway no. 7, the pump room and the technical channel – the stairway from the basement to the ground floor is blocked);
- four reinforced concrete stairways:
    * Stairway no. 3 (complete rebuilding) and stairway no. 4 – from the basement to the 2nd floor;
    * Stairway no. 5 and stairway no. 7 - from the basement to the ground floor.

Under project no. 145/2002, drafted by the REMON PROJECT SRL company, the strength structure of the basement underwent the following works:

- partial or total filling in of the empty spaces in the brick walls (the area of the archive and of the treasury chambers);

- using perimeter frameworks for planking the empty spaces where the doors used to be (the area of the treasury chambers);
- veneering, with reinforced concrete (concrete C30/37 and steel S355, S345 - PC52 and S255 - OB37), the brick walls in the three treasury chambers; the thickness of the reinforced concrete planking is 300 mm;
- concrete super-pouring (concrete C30/37 and steel S355, S345 – PC52 and S255 - OB37) of the supporting plate of basement floor, in the three treasury chambers; the thickness of the super-pouring is 120 mm;
- replacement the floor made of brick bolts and metal profiles type "I" with a reinforced concrete one (concrete C30/37 and steel S355, S345 - PC52 and S255 - OB37) in the three rooms of the treasury; the thickness of the reinforced concrete floor is 300 mm; metal profiles were kept and were embedded in the reinforced concrete;
- reinforcing the edges of the access doors in the three rooms of the treasury, with metal profiles (L 100x100x10, S235 - OL37)
- the three rooms of the treasury have vertical and horizontal waterproofing systems.

According to project no. 278/2008, issued by the ART PROJECT ION SRL company, there were no interventions at the strength structure.

The superstructure is made of load-bearing walls made of simple/non-reinforced brick (ZNA). The exterior walls have a thickness of 560 mm, 420 mm and 280 mm (without plaster) and the interior walls have thickness of 700 mm, 560 mm, 420 mm and 280 mm (without plaster). On the ground floor of the building, on the left side (looking at the building from Lipscani Street), at the narrower end of the building, there are two metal poles. The floor above the ground floor is made up of small brick bolts (140 mm thick) and metal profiles type "I" (laminated profiles I 200, I 220, 2 I 220, I 300 and I 360/1650 mm ÷ 2450 mm - distance between girders). The ceiling over the two floors is made of main metallic girders type "I" (laminated profiles I 180, I 200, I 220, 2 I 220, I 300 and I 360/1650 mm ÷ 4000 mm – distance between girders and profiles that are probably made of tin sheets, with a height of 340 mm and 420 mm), secondary wooden girders (150 mm x 240/260 mm, arranged on the height of the metal girders, at a ~ 700 mm distance between girders) and the floor (~ 20 mm thick).

On the left side of the building (looking at the building from Lipscani Street), at the narrower end of the building, there is an ovoid space, in plan, going up to floors 1 and 2 (missing at the ceiling over the 1st floor). On the upper part of this area, there is a dome, made of a wooden framework and covered with tin sheet.

The space for the central hall has an octagonal shape, in plan, that is kept over the three floors, above the ground (ground floor, 1st and 2nd floor) – fastening planks over these floors are missing. At the top of the central hall, there is a dome made of a

metal frame and tin covers. In the center of the dome, there is a skylight. Also, on the perimeter of the dome between its base and skylight, there are eight round windows.

It is mentioned that the central hall and facades have very nice architectural decorations.

According to the strength project no. 1260/1978, prepared by the "Carpați" Institute of Design, the strength structure of the building was subjected to the following works:

- total or partial demolition of structural and non-structural walls of brick for re-compartmentation of the space;
- partial demolition of the ceilings (at the new stairways, as well as those ceilings that were replaced with reinforced concrete ones);
- partial or total demolition of the stairs;
- partial or total walling of the gaps in the brick walls;
- vertical elements:
  * Four new metallic pillars placed in the four newly created spaces, in 1980, adjacent to the central hall; two pillars are located on the ground floor and at the 1st floor (spaces on the left of the central hall, looking at the building from Lipscani St.) and two of the pillars are placed on the ground floor and at the 1st and 2nd floors (spaces on the right of the central hall, looking at the building from Lipscani St.);
  * Two new reinforced concrete pillars, placed in two of the four newly created spaces, in 1980, adjacent to the central hall, on the right side of the central hall, respectively (looking at the building from Lipscani St.); the two pillars are placed only on the ground floor and 2nd floor;
  * A new, reinforced concrete wall, which includes two metal pillars, at the ends; the new wall is located at the ground floor, on the left side of the building (Looking at the building from Lipscani St.), at the narrower end of the building;
  * veneering a wall with reinforced concrete, at the 1st and 2nd floors, on the left side of the building (looking at the building from Lipscani St.) at the narrower end of the building;
  * Reinforced concrete walls for two elevators, from the basement to the 2nd floor;
  * Reinforced concrete walls for stairway no. 3 - from the basement to the 2nd floor;
- horizontal elements:
  * Reinforced concrete floors:
    - adjacent to stairway no. 3 including toilets (above the ground floor and the 1st and 2nd floors);
    - adjacent to stairway no. 4 (only over the ground and 1st floor);
    - adjacent to stairway no. 6 (only over the ground floor);

- a walkway only at the planks over the ground floor (near the stairway no. 2);
- kitchen and dining room (over the ground floor, only);
- washrooms (over the 1st floor, only);

* Strengthening of steel girders I 220, I 300 and 2I 220, belonging to the ceiling above the ground floor, with belts of reinforced concrete having a width of 400 mm (I 220 and I 300) and 550 mm (2I 220) positioned centrally with respect to the metal girders; the reinforced concrete belt and the steel girders were connected;
* Consolidation of seven steel girders I 220, at the ceiling above the 1st floor (near stairway no. 3), with profiles I 160 and a steel band of 100x8, disposed over the metal girders (I 220 - I 160 - strip) which were secured to them by welding;
* Five new metal girders on the floor above the 1st floor, four located in the four new spaces created on both sides of the central hall and one located next stairway no. 3;
* Two new metal girders on the planking above the 2nd floor, located in two of the four new spaces created on both sides of the central hall, respectively located to the right of the central hall (looking at the building from Lipscani St.);
* Replacement of the floor planking over the ground floor: rubble filling (150 mm average thickness) – asphalt cardboard - slightly reinforced layer (40 mm) - the wooden girders positioned on the metal girders, and the floorboard were removed;
* Replacement of the floor planks over the 1st floor: the floorboard (20 mm thick) - rubble filler (150 mm) - asphalt cardboard - slightly reinforced layer (40 mm) - the wooden girders positioned on the metal girders, and the floorboard were removed;

- five reinforced concrete stairways:

* Stairway no. 1, from the ground floor to the 1st floor – was remade and the direction of ascent was changed;
* Stairway no. 2, from the ground floor to the 2nd floor;
* Stairway no. 3 (fully remade) and stairway no. 4 – from the basement to the 2nd floor;
* Stairway no. 6, from the ground floor to the 2nd floor.

According to on-site inspections and the strength project no. 1260/1978, prepared by the “Carpați” Institute of Design, the following works were not performed:

- Stairway no. 6, from the ground floor to the 2nd floor;
- a new reinforced concrete wall, which includes the two ends of the metal pillars located on the ground floor, on the left of the building (looking at the building from Lipscani St.), at the narrower end of the building.

Also, over the 1st floor, according to the on-site inspection (several uncovered areas on the right side of the building - looking at the building from Lipscani St.), the ceiling is made all the brick bolts (140 mm) and metal profiles type "I".

According to the project no. 145/2002, issued by the REMON PROJECT SRL company, the strength structure of the building was subjected to the following works:

- partial or total filling in of the empty spaces in the brick walls;
- partial or total filling in of the empty spaces for doors, in the brick walls, including perimeter frames of reinforced concrete for planking;
- perimeter frameworks of reinforced concrete for planking the empty spaces where doors used to be.

According to the project no. 278/2008, issued by the ART PROJECT ION SRL company, there were no interventions to the structural frame.

The roof, having an attic where people can enter, is made of a wooden structure and tin sheet, being in a relatively good state of repair.

On the left side of the building (looking at the building from Lipscani St.), at the narrowest side of the building, there is a dome made of a metal frame and tin covers.

At the top of the central hall, there is a dome made of a metal frame and tin covers.

On a small area, the roof is a terrace where people cannot enter and consists of a reinforced concrete floor.

The enclosures are made of full brick, having a thickness of 560 mm, 420 mm and 280 mm (without plaster).

Compartmentations are made in the walls of the full brick with a thickness of 700 mm, 560 mm, 420 mm, 280 mm and 140 mm (without plaster).

Vertical circulation is assured by:

- seven reinforced concrete stairs *Stairway no. 1 - from the basement to the 1st floor;
  *Stairway no. 2 - from the ground floor to the 2nd floor;
  * Stairway no. 3 and no. 4 - from the basement to the 2nd floor;
  * Stairway no. 5 and no. 7 - from the basement to the ground floor;
  *Stairway no. 6 - from the ground floor to the 2nd floor;
- three elevators: two of them from the basement to the second floor and one for freight, from the ground floor to the basement.

We mention that the identification and description of the strength structure were made on the basis of the sketches to scale prepared by the “Carpați” Institute of Design in 1978 and the SACO CONSTRUCT SRL company in August 2017, and on the basis of strength project drawn up by the “Carpați” Institute of Design in 1978 and by the REMON PROJECT SRL company, in April 2002. For identification purposes, we used the wording of the mentioned documents (included in the technical registry of the building).

10. DESCRIPTION OF THE STATE OF THE CONSTRUCTION AT THE DATE OF EVALUATION

The construction behaved poorly, given the actions it faced during its operation.

We did **not** notice:

a) changes in the position of construction objects, in relation to the their implantation environment, that could have taken place:

- directly, by visible dislocations (horizontal, vertical or gradients);
- by visible side effects:

* Separation of sidewalks, stairs, trach ducts and other auxiliary elements, from the basis or body of the building, or the appearance of empty spaces, cracks, uprooted elements;

* The appearance of fissures and cracks in the areas of continuity of the construction elements, or closing the empty spaces between various types of construction elements, sections of the building; progressive obstruction of the holes at ground level by the submergence of the construction element; degradation or blocking the operation of the equipment, subject to its position (elevators, equipment, etc.);

b) changes manifested in the form of objects:

- directly visible through vertical or horizontal deformations and rotations;
- side effects such as stiff windows or doors, distorted pipes, bended bars or other constructive elements;

c) changes in the level of protection and comfort of the building:

- in terms of waterproofing, soundproofing, thermal-proofing, hydrofuge capabilities (with the exceptions mentioned below);
- condensation, fungi, unpleasant fungus (with the exceptions mentioned below);

d) defects and degradation that affect the functionality of the construction elements:

- plugged leaks (pipes, gutters, drains, channels);
- opening of the functional joints, etc.;

e) defects and degradation of the strength structure, having an influence on the safety of the construction objects:

- fissures and cracks (with the exceptions mentioned below);
- corrosion of the metal elements and of the reinforced concrete elements (with the exceptions mentioned below);
- defects manifested by stains, cracks, exfoliation, erosion etc. (with the exceptions mentioned below);
- singeing of compressed elements or the breaking of large elements;
- weakening or destruction of the joints of metallic elements (not visible);
- rotted or weakened wood elements, caused by biological attacks, etc.

We noticed:

a) changes in the level of protection and comfort of the building:

- in terms of waterproofing, soundproofing, thermal-proofing, hydrofuge capabilities, manifested by local damage to the brick walls and the roof;
- in terms of aspect, manifested by wet surfaces, water infiltrations, fissures, cracks and peeling of the protection layers, as well as the changed color of the surfaces: the plaster of the brick walls and of the ceilings - especially in the unused portions of the building (more precisely, in the basement, in the areas that were not renovated);
- condensation, fungi, unpleasant fungi (especially) in the areas of the basement that were not renovated;

b) defects and degradation of the strength structure, having an influence on the safety of the construction objects:

- possible cracks and crevices in the brick walls, in areas where these phenomena were highlighted in the plasterwork;
- the visible corrosion of the metallic elements (in the non-renovated basement areas), as well as of the reinforced concrete elements (in the non-renovated basement areas);
- defects manifested by stains, cracks, exfoliation, erosion of brick walls in the non-renovated areas in the basement (both mortar and brick).

According to norm MP 025-04 - Methodology for risk assessment and proposals of intervention needed to the structures of historical monuments, as part of their restoration, the construction falls between degree 2 and 3 of damage. We made the following comments (extracted from norm). Art. 5.2.6 of this norm define levels 2 and 3, as follows:

Level 2. Slightly affected constructions:
- small cracks in the plaster of walls and ceilings;
- large cracks or partial rupture of the chimneys, attics and blind walls;
- displacement of partial slide of roof elements;

- small cracks in the structural elements that do not affect the strength capability and/or the rigidity of the building as a whole;

Level 3. Affected constructions:
- small and large, angled, vertical and horizontal cracks in the structural elements of the brickwork;
- collapsed chimneys, attics or blind walls;
- movements of the girders from the supporting elements, on the floor;
- movement or collapse of the roof.

On this classification, the following considerations are to be made:

There are major works (repairs, consolidations - 1980) that were made on the construction, as well as current maintenance work and local furnishing (2002 and 2008). Probably, over time, other works were done on the building, as well (current repairs, furnishings, etc.).

In areas where the building was restored, there are no visible signs of degradation and possible failures of the strength structure.

In areas where the building has not been restored (especially in the basement) there are visible signs of degradation or flaws (as described above).

Brutal and uncontrolled interventions in the strength structure of the building, for various installations (plumbing, heating, air conditioning, electrical power and gas supply) led to the creation of empty spaces in the structure of the brick elements. Frequently, this is the case in section of the building that bears the most load or that has to bear very heavy loads.

In Bucharest's historical center, the municipality performed rehabilitation works of the technical infrastructure, including the streets bounding the property at 18-20 Lipscani St. It is unknown whether, in time, the contact area between street – basis was degraded, for example: detachment of the sidewalk from the basis of the building, the appearance of joints, cracks. Moreover, the street-basis joining details were not clarified, so far, since, at this time, there are relatively large spaces between the street and the basis of the building.

a) Effects of past seismic actions

During its existence, the building faced several major earthquakes, whose intensity levels are given in the table below.

Table - maximum intensity of major earthquakes originating in the Vrancea area, as signaled on site

Date (dd-mm-yy)	Time in the place of origin GMT (HMS)	Epicentral coordinates		Depth h (Km)	Magnitude	DH (km)	DE (km)	I_o (MSK)	I_A (MSK)
		Lat. N	Long. E						
31.08.1894					6,9				
06.10.1908					6,8-6,9				
25.05.1912					6,4				
10.11.1940	01:39:00	45,800	25,700	133	7,4	198	147	9,0	8,0
04.03.1977	19:21:56	45,340	26,300	109	7,2	141	89	8,5	7,8
30.08.1986	21:28:37	45,530	26,470	133	7,0	174	113	8,0	7,3
30.05.1990	10:40:06	45,820	26,900	91	6,7	180	155	8,0	6,2
31.05.1990	00:17:48	45,830	26,890	79	7,0	174	155	7,0	4,9

Caption: DH - distance from the hypocenter
DE – distance from the epicenter
I_0 - intensity of the hypocenter
I_A - intensity in the location
h - depth of epicenter

According to the strength project no. 1260/1978, prepared by the “Carpați” Institute of Design, following the earthquake of November 10, 1940, the Palace of the former Dacia insurance company suffered insignificant degradation and damage.

We have no written documents on its behavior during the earthquake of 1940, however, according to the information we collected, the building had no significant earthquake damage. This behavior is confirmed during the recent earthquake, as well.

According to the strength project No. 1260/1978, prepared by the “Carpați” Institute of Design, during the earthquake of March 4, 1977, Palace of the former Dacia insurance company was subjected to several situations of degradation and damage.

During the earthquake of March 4, 1977, the building had an overall good behavior. The damage was local, and its stage "can be characterized as early".

We can see some cracks in the transversal walls, especially in the area of stairway no. 2, as well as in other isolated walls of the building. They typically start at the corner of door empty spaces and the vary in length from 0,50 to 3 m.

Also, some of the parapets at the eastern end of the building have insignificant cracks. Otherwise, the damage is limited to collapse of some chimneys and damage to finishing elements, especially at the ceilings.

In assessing the stability and strength of the building, we must take into account internal and invisible micro-degradation of the masonry materials, highlighted by the fissures and cracks in the plaster of the walls.

The relatively good behavior of the building to the seismic action dated March 4, 1977 can be explained by a number of factors that worked in favor of the building, such as:

- the general compliance of the structure, as the walls have a proper layout and density, with the exception of the eastern corner, on a transversal direction;

- the total area of the structural walls take less than 10% of the built area, and their positioning in the two main directions is nearly equal;

- the quality of materials and work, as mentioned, is among the best for the era;

- the type of earthquake that took place on March 4, 1977 was in favor of these buildings that have a low height and high rigidity.

However, the building has a certain weakness to horizontal loads, such as:

- the lack of rigid horizontally planks, apart from the one over the ground floor, which has, however an uncertain strength;

- the absence of the plank above the 1st floor, at the eastern end of the building;

- disconnection of all planks in the central area, which divides the building into two distinct bodies.

According to the strength project No. 1260/1978, prepared by the “Carpați” Institute of Design, the building was be subjected to consolidation works. It is not known whether the consolidation works were actually performed (partially, in full or other consolidation measures were provided for) and we do not know the quality of the performed works. However, at present, we note that (after three earthquakes of high intensity, in 1986 and 1990), there is no indication (from the visual inspection) that consolidation works were not executed (at least some of them), as described in the strength project. There may be, however, some cracks/crevices caused by the earthquakes mentioned in the table above, that were not fixed.

Following the investigations carried out on the building, it was found that it has damages and degradations (as shown above). Most of these damage are visible. The complete identification of the degradation can be done only after removing the plasterwork.

b) Other effects

There are degradations of the construction not caused by seismic actions. They are described in detail, above. Here are the main causes that have led to these damages:

- the improper maintenance of the renovated and/or unused spaces;
- the lack of proper ventilation of the unused part of the building, especially in the basement.

We also note that, at present, the building is used only in par, being properly maintained only in the used areas.

c) Chemical and physical degradation of the structural materials

It is not known whether the strength structure materials display physical and chemical degradation (except as stated in the first part of chapter 10 in this technical expertise report - corrosion of metal components and fittings, as well as erosion of the brick walls - both the mortar and bricks are affected). A complete identification of the degradation level can be done only after the removal of the plaster.

11. RESULTS OF VARIOUS INVESTIGATIONS IN ORDER TO DETERMINE THE STRENGTH OF MATERIALS

For the foundation soil, a geotechnical study was prepared by PFA Dimofte Mihai, in September 2017. Its conclusions were presented in section 6.3 of this technical expertise report.

In the making of the brick walls, the following materials were used:

- the old-type, filled, pressed bricks, with the following dimensions: 280 mm x 140 mm x 70 mm. They were made of clay mass, of good quality, that can be assimilated to group 1, that can stand compressure $f_{b,average}$ = 5,7 ÷ 21,4 N/mm^2, mark C50 ÷ C100, according to the test report no. 145 P2/September 6, 2017, issued by the LABORATORUL CENTRAL S.A. company.
- lime mortar with compressive strength f = 0,73 ÷ 2,34 N/mm^2, mark M10 (with one exception, in the attic - M = 4 – the unit of measure for marks is daN/cm^2), according to the test report no. 146 P2/September 6, 2017, issued by the LABORATORUL CENTRAL S.A. company.

For the strength elements of the reinforced concrete (planks and walls) concrete class C20/25 was used (according to the test report no. 976/18.9.2017, issued by the INSTAL TEST SRL company) and fittings Ø6/100 ÷ 150/100 ÷ 150, steel S255 - OB37 (according to the test report no. 977/18.09.2017, issued by the INSTAL TEST SRL company). Also, the test report no. 977/18.09.2017, issued by the INSTAL TEST SRL company, has revealed the existence of four metal pillars made of type "I" profiles, as well as metallic girders also made of type "I" profiles.

According to the project no. 145/2002, issued by the REMON PROJECT SRL company, strength elements of the reinforced concrete (veneering, concrete

overpouring, planks and frames for planking empty spaces at doors) used concrete of class C30/37 and steel of class S355, S345 - PC52 and S255 - OB37.

12. ESTABLISHING THE EVALUATION METHODOLOGIES AND SPECIFIC CALCULATION METHODS

The evaluation methodology is based on the following criteria (under the "Code of Seismic Design - Part III, provisions for the seismic evaluation of existing buildings "call letter P100-3/2008)

1. Technical knowledge at the time the design was made and the construction was erected

The building was erected at the end of the nineteenth century.

The construction was made on the basis of technical knowledge and technological procedures specific to the age. The construction was not made on a design basis. The construction system of the building is strictly "gravitational" without any seismic protection measures. The composition and strength structure of the building do not take into account anti-seismic design principles.

2. The complexity of the building, particularly in structural terms, defined by proportion (openings, height), regularity, etc.

The structural system was identified in its entirety. The structure is made of simple/non-reinforced (ZNA) brick walls. The openings are large in both orthogonal directions (≤14,0 m in the longitudinal direction and ≤20,0 m in the transverse direction). The floor heights are large (h = 3,86 m ÷ 4,55 m, $h_{\text{left dome.}}$ = 8,45 m şi $h_{\text{center dome.}}$ = 25,65 m). The building and its strength structure are irregular, both horizontally and vertically.

3. Data available for the preparation of the evaluation (level of knowledge)

The level of knowledge is limited - KL1:

- geometry – from a complete sketch to scale of the building;
- detailed composition - based of simulated design, according to the practice of the time when the construction was erected and on the basis of a limited site inspection;
- materials – from the limited field tests, based on the examination on the spot and taking account of the materials used at that time;
- calculation - MRS (response spectrum modal calculation);
- trust factors - 1.35.

4. Function, importance and value of the building

The function of the building is that of a museum and bank.

The importance class of the building is II.

The building is included in the List of Historical Monuments of Bucharest, code LMI 2015-B-II-mA-19021, the Palace of the former Dacia – România insurance

company, 18-20 Lipscani St, District 3 Bucharest. According to the order of the Ministry of Culture and National Heritage no. 2.828/2015 amending Addenda 1 of the order of the Ministry of Culture and Religious Affairs no. 2.314/2004, that approves the updated List of Historical Monuments and the List of Historical Monuments that are gone, dated December 24, 2015.

5. Conditions for seismic hazard at the site - the design seismic acceleration (a_g), local ground conditions

Acceleration of the land under the design is: a_g = 0,24g = 2,36 ms^{-2} for the average recurrence time of earthquakes IMR = 100 years (Bucharest - norm P100/1-2006).

The values of the control periods (corner) are: T_B = 0,16 s, T_c = 1,6 s, T_D = 2,0 s (Bucharest - norm P100/1-2006).

6. Type of structural system

The structure was identified in its entirety. The superstructure is made of simple/full, non-reinforced (ZNA) brick walls.

7. Performance level set for the building

The chosen performance objective s high-end - OPS. This is made of meeting performance requirements for *limiting the level of degradation* (associated to the service limit state - SLS) and to the *life safety* performance level (associated with the ultimate limit state) to the seismic action having IMR = 100 years.

Based on the above criteria and in accordance with art. 6.8.1 (2) Norm P100-3/2008 level 2 methodology is chosen – the current methodology for ordinary buildings of any kind.

Level 2 methodology involves:

1. A qualitative assessment consisting of checking the list of conditions for the structural composition (more detailed than in the case of level 1 methodology), which can be found in the addendum corresponding to the structures of different materials.

2. A quantitative assessment based on an elastic structural calculation and behavior factors differentiated by types of elements.

The interventions proposed in this expertise do not change the class of importance or the category of importance of the building.

13. EVALUATION OF THE SEISMIC PERFORMANCE OF THE CURRENT BUILDING

The purpose of the evaluation of the seismic performance of the building is to establish its vulnerability in terms of the earthquakes that are specific to the location, i.e. the extent to which the building meets the performance requirements associated to the seismic action.

The evaluation process involves two types of operations:

- a qualitative evaluation;

- an evaluation by calculation.

13.1 Qualitative assessment

The qualitative evaluation is intended to determine the extent to which the analyzed building complies with the general rules for the structure and with the details of structural and non-structural elements. The components of the qualitative assessment refer to the categories of conditions presented below.

a) Conditions referring to the load trajectory
b) Conditions referring to redundancy
c) Conditions referring to the building's configuration
d) Conditions referring to the interaction between the structure and other constructions or elements
d1) Conditions referring to the distance to the neighboring constructions
d2) Conditions referring to non-structural components
e) Conditions referring to the specific composition of the different categories of structures
f) Conditions for the horizontal diaphragms of the buildings
g) Conditions referring to the infrastructure and foundation soil

A detailed qualitative assessment (for level 2 methodology) is made by taking into account:
- the principles of favorable constructive composition which, according to the experience of past earthquakes, have a favorable impact on the seismic behavior of brick buildings;
- the scale of deterioration caused by the earthquake and/or other actions.
A detailed qualitative assessment can be done by referring to the following criteria:

1. The quality of the structural system
1.1 The special connection between the structural elements is poor:
- the connection between the walls of the two orthogonal directions is probably made by intertwining brickwork;
- the connection between walls and floors is not assured (no reinforced concrete belts).
1.2 In percents, the brickwork areas are 6.03% on the longitudinal direction (parallel to Lipscani St.) and 5.57%, on the transversal direction (perpendicular to Lipscani St.). According to norm P100-1/2006, Table 8.1, for the ground floor height standard, the minimum percent is 6, and the maximum height standard is limited to the ground floor. There is a small difference (7.6%) between the brickwork areas in the two orthogonal directions.

The criterion has a **major failure**: **0 pts.**

2. The quality of the brickwork

2.1 The quality of the elements is below the requirements of the current norms (P100-1/2006 CR6-2013).

2.2 We do not known the uniformity of the intertwining, the uniformity of the joints, or the degree of filling with mortar.

The criterion has a **moderate failure**: **6 pts.**

3. Type of floors

3.1 The floors, made of main metal girders, secondary girders made of wood and boards (over the 1st and 2nd floor), have a small horizontal rigidity, except for the parts of floors made of reinforced concrete, that have a good rigidity in their plan. Floors over the basement and above the ground floor, made of brickwork (arches, bolts with laminated profiles type "I") have a relatively good horizontal rigidity.

3.2 The connection of the floors described in the previous paragraph, with the brickwork walls is ineffective: they cannot ensure the compatibility of structural walls' deformations and do not prevent the tilting of the walls in case of seismic forces that are perpendicular to the plane (no reinforced concrete belt).

The criterion has a **major failure**: **4 pts.**

4. Plane configuration

4.1 In plane, the construction and its strength structure are not compact - the ratio of the edges is high, i.e. 2.68 ÷ 7.83, there are no withdrawals in plane, there are no bow windows.

4.2 In plane, the geometry and the structural frame of the building are not symmetrical.

The criterion has a **major failure**: **4 pts.**

5. The configuration in elevation

In elevation, the geometry and strength structure of the construction are relatively uniform: there are no withdrawals and no gaps created by the increased area of the empty spaces in the walls.

The criterion has a **moderate failure**: **8 pts.**

6. Distances between the walls

The distances between the structural walls are large in both orthogonal directions (≤14,0 m in the longitudinal direction and ≤20,0 m the transverse direction) and the heights between floors are high (h = 3,86 m ÷ 4,55 m, $h_{left\ dome}$ = 8,45 m and $h_{center\ dome.}$ = 25,65 m). The structure does not have rare walls (cellular system) under norm CR 6-2013 (the maximum distances between the walls ≤ 9.00 m, a floor height ≤ 4,00 m and the area of the wall cell, in the two main directions ≤ 75 m^2).

The criterion has a **moderate failure**: **4 pt.**

7. Elements entailing lateral thrusts
There are arches, bolts and domes that entail lateral thrust.
The criterion has a **moderate failure**: **6 pts.**

8. Type of foundation soil and foundations
The foundation soil is regular.
The foundations are made of brickwork.
The criterion has a **moderate failure**: **8 pts.**

9. Possible interactions with adjacent buildings
The building consists of one section. The building is attached, on the right side (looking at the building from Lipscani St.) to the building located at 16 Lipscani St. and is free, at the remaining sides. The two buildings are separated from each other by a filled space whose dimensions are unknown.
The criterion has a **moderate failure**: **4 pts.**

10. Non-structural elements
There are major building elements (blind walls, frontons, headwalls), heavy plywood and other important decorative elements at risk of collapsing.
The criterion has a **moderate failure**: **4 pts.**

After the qualitative analysis, indicator R1 is determined, as follows:

R1=0 + 6 + 4 + 4 + 8 + 4 + 6 + 8 + 4 + 4 = **48 pts**.

Depending on the scale and distribution of the damage level upon the whole building (caused by the earthquake and/or other actions), indicator R2 is determined, having the following equation:

$\mathbf{R_2} = A_v + A_h = 50 + 20 =$ **70 pts**.

where:
- Av – damaged vertical elements;
- Ah – damaged horizontal elements.

The values for A_v and A_h are evaluated according to Table D3 of Norm P100-3/2008.

13.2 Assessment by calculation

Assessment by calculation is a quantitative procedure that verifies whether the

existing buildings, damaged or not, meet the limit requirements taken into consideration when referring to relevant design seismic actions: the requirement of life safety (SLU - ultimate limit states) and the requirement of limiting degradation (SLS - service limit state).

The detailed assessment by calculation (for level 2 methodology) is made upon a linear elastic calculation model, analyzed modal calculation method with response spectra (MRS).

In the static and dynamic calculation of structure, as well as in the verification of the elements, the standards and regulations in force were complied with, namely:

Eurocodes

1. Bases of design

- SR EN 1990: 2004 - Eurocode: Basis of Structure Design
- SR EN 1990: 2004/A1:2006/AC: 2010 - Eurocode. Basis of Structure Design
- SR EN 1990: 2004/NA: 2006 - Eurocode: Basis of Structure Design. National Addendum

2. Actions on constructions

- SR EN 1991-1-1:2004 - Eurocode 1: Actions on structures. Part 1-1: General actions, specific weight, own weight, payloads for buildings
- SR EN 1991-1-1:2004/AC: 2009 - Eurocode 1: Actions on structures. Part 1-1: General actions, specific weight, own weight, payloads for buildings - Erratum
- SR EN 1991-1-1:2004/NA: 2006 - Eurocode 1: Actions on structures. Part 1-1: General actions. Specific gravity, own weight, payloads for buildings. National Addendum
- SR EN 1991-1-3:2005 - Eurocode 1: Actions on structures. Part 1-3: General actions. Snow loads
- SR EN 1991-1-3:2005/AC: 2009 Eurocode 1: Actions on structures. Part 1-3: General actions. Snow loads - Erratum
- SR EN 1991-1-3:2005/NA: 2006 - Eurocode 1: Actions on structures. Part 1-3: General actions. Snow loads. National Addendum
- SR EN 1991-1-4: 2006 Eurocode 1: Actions on structures. Part 1-4: General actions. Wind actions
- SR EN 1991-1-4: 2006/A1:2010 - Eurocode 1: Actions on structures. Part 1-4: General actions. Wind actions - Amendment
- SR EN 1991-1-4: 2006/AC: 2010 - Eurocode 1: Actions on structures. Part 1-4: General actions. Wind actions - Erratum
- SR EN 1991-1-4: 2006/NB: 2007 - Eurocode 1: Actions on structures. Part 1-4: General actions - Wind actions. National Addendum

3. Concrete Structures

- SR EN 1992-1-1:2004 Eurocode 2: Design of concrete structures. Part 1-1: General rules and rules for buildings
- SR EN 1992-1-1:2004/AC: 2008 - Eurocode 2: Design of concrete structures. Part 1-1: General rules and rules for buildings - Erratum
- SR EN 1992-1-1:2004/NB: 2008 - Eurocode 2: Design of concrete structures. Part 1-1: General rules and rules for buildings. National Addendum

4. Steel Structures

- SR EN 1993-1-1:2006 - Eurocode 3: Design of steel structures. Part 1-1: General rules and rules for buildings
- SR EN 1993-1-1:2006/AC: 2006 - Eurocode 3: Design of steel structures. Part 1-1: General rules and rules for buildings - Erratum
- SR EN 1993-1-1:2006/NA: 2008 - Eurocode 3: Design of steel structures. Part 1-1: General rules and rules for buildings. National Addendum

5. Brickwork

- SR EN 1996-1-1:2006 - Eurocode 6: Design of brickwork structures. Part 1-1: General rules for reinforced and non-reinforced brickwork
- SR EN 1996-1-1:2006/AC:2010 - Eurocode 6: Design of brickwork structures. Part 1-1: General rules for reinforced and non-reinforced brickwork structures - Erratum
- SR EN 1996-1-1:2006/NB:2008 - Eurocode 6: Design of brickwork structures. Part 1-1: General rules for reinforced and non-reinforced brickwork. National Addendum

6. Foundations

- SR EN 1997-1:2004 - Eurocode 7: Geotechnical design. Part 1: General rules
- SR EN 1997-1:2004/AC:2009 - Eurocode 7: Geotechnical design. Part 1: General rules - Erratum
- SR EN 1997-1:2004/NB:2008 Eurocode 7: Geotechnical design. Part 1: General rules. National Addendum

7. Earthquake strength

- SR EN 1998-1:2004 - Eurocode 8: Design of structures for earthquake strength. Part 1: General rules, seismic actions and rules for buildings

- SR EN 1998-1:2004/AC:2010 - Eurocode 8: Design of structures for earthquake strength. Part 1: General rules, seismic actions and rules for buildings - Erratum
- SR EN 1998-1:2004/NA:2008 - Eurocode 8: Design of structures for earthquake strength. Part 1: General rules, seismic actions and rules for buildings. National Addendum
- SR EN 1998-3:2005 - Eurocode 8: Design of structures for earthquake strength. Part 3: Assessment and strengthening constructions
- SR EN 1998-3:2005/AC:2010 - Eurocode 8: Design of structures for earthquake strength. Part 3: Assessment and strengthening constructions - Erratum
- SR EN 1998-3:2005/NA:2010 - Eurocode 8: Design of structures for earthquake strength. Part 3: Assessment and strengthening constructions

Romanian standards

1. Concrete structures

- STAS 438/1-89 - Steel products for concrete reinforcement. Hot laminated steel reinforced concrete. Grades and technical quality requirements
- STAS 438/1-89/A91:2007/C91:2009 - Steel products for concrete reinforcement. Hot laminated steel reinforced concrete. Grades and technical quality requirements. Errata
- SR 438-4: 1998 - Steel products for concrete reinforcement. Periodical profile wire obtained by cold plastic deformation

2. Steel structures

- SR EN ISO 13920: 1998 - Welding. General tolerances for welded constructions. Dimensions for lengths and angles. Shapes and positions
- STAS 767/0-88 - Civil, industrial and agricultural constructions. Steel constructions. General technical quality requirements
- STAS 767/2-78 - Civil, industrial and agricultural constructions. Riveted joints and screwed joints in steel constructions. Development requirements.

3. Foundations

- STAS 3300/1-85 - Foundation land. General principles of calculation.
- STAS 3300/2-85 - Foundation land. Calculation of the foundation land in case of direct foundation.
- STAS 6054/77 - Foundation land. Maximal depths of freezing. Mapping the territory of the Socialist Republic of Romania

Norms

1. Basis of design

- CR 0-2012 - Design code. Bases of Structural Design in Constructions

2. Actions on constructions

- CR 1-1-3 - 2012 - Design code. Evaluation of snow action on buildings
- CR 1-1-4 - 2012 - Design code. Evaluation of wind action on buildings

3. Concrete Structures

- NE 012/1-2007 - Norm for concrete production and development of concrete, reinforced concrete and pre-compressed concrete. Part 1: The production of concrete
- NE 012/2-2010 - Norm for the production and development of concrete, reinforced concrete and pre-compressed concrete. Part 2: Development of concrete works
- CP 012/1-2007 - Code of practice for the production of concrete
- ST 009-2011 - Technical specification regarding steel products used as reinforcing elements: requirements and performance criteria

4. Steel Structures

- C 150-1999 - Norm on the quality of steel welded joints of civil, industrial and agricultural constructions
- GE 054-2006 - Guide for monitoring the behavior, in service, of anti-corrosion protection elements in steel structures. Intervention measures
- GP 121/1-2013 - Guide of design and development of anti-corrosion protection elements in steel constructions
- NP 042-2000 – Norms on the general design requirements. Verification, by calculation, of the metal construction elements and their connections.

5. Brickwork structures

- CR 6-2013 - Design code for brickwork structures
- CR 6-2006 - Design code for brickwork structures (recommended for old buildings)
- MP 007-99 – Investigation methodology in case of old brickwork
- MP 025-04 - Methodology for risk assessment and intervention proposals needed for the structures of buildings that are monuments of historical relevance, as part of their restoration.

6. Foundations

- NP 112-2014 - Norm on the design of surface foundations

7. Earthquake strength

- P 100-1/2006 - Code of Seismic Design - Part I: Design provisions for buildings
- P100-3/2008 - Code of Seismic Design - Part III, provisions for the seismic evaluation of existing buildings

8. Quality check and acceptance of construction works and installations

- C 56-1985 - Norm for quality check and acceptance of construction works and installations
- P 130-1999 - Norm on the behavior of constructions in time

Laws

- Law no. 10 of January 18, 1995 - Law on Quality in Constructions, as amended and supplemented
- Law no. 50 of 29 July 1991, on authorizing constructions and some measures for residential developments, as amended and supplemented;
- Order no. 839 of 12.10.2009, approving the rules for the implementation of Law no. 50/1991 regarding the authorization of construction works
- Order no. 1867 of 16.07.2010, amending and supplementing the Methodological Norms for the implementation of Law no. 50/1991 regarding the authorization of construction works
- Order no. 777 of May 26, 2003, for approval of technical regulations "Guidelines for the professional certification of technical specialists working in constructions", as amended and supplemented
- Government Decision no. 925 of November 20, 1995, for the approval of technical expertise and quality verification of projects, works and constructions, as amended and supplemented
- Government Decision no. 766 of December 10, 1997, for the approval of regulations regarding quality in constructions, as amended and supplemented
- Decision no. 273 of June 14, 1994 - Rules of reception of construction works and their installations, as amended and supplemented
- Government Ordinance no. 20/1994, on securing the existing buildings
- Government Ordinance no. 67/28 August 1997, amending and supplementing Government Ordinance no. 20/1994 on securing the existing buildings (renamed Ordinance on measures to reduce seismic risk of the existing buildings)

Under P100-1/2006, Articles 4.4.3.2 and 4.4.3.3, the structure is irregular both in plane and vertically.

A spatial calculation model and the modal calculation method with a response spectrum for seismic action were selected.

The strength structure was schematized as a spatial system consisting of linear finite element (bar or "frames") and of surface (walls and planks or "shell"). The vertical elements (walls) were embedded into the base (at foundation level). The floors were not considered as rigid washers. Gravitational loads were evenly distributed over the slabs and girders. For the seismic action, the design spectrum defined by the norm P100-1/2006 was used. A static and dynamic analysis, in the elastic range, was made by using the ETABS 2016 Nonlinear Version 16.2.0.

The following results were obtained:

- vibration modes;
- nodal displacements;
- efforts.

The performed analyzes led to the following conclusions:

a) The periods of vibration of the building are:

$T_1 = 0,401$ s,

$T_2 = 0,374$ s,

$T_3 = 0,363$ s.

b) The total mass and weight are:

$$A_{tot} = 7973,0\,m^2$$

$$M_{tot} = 16948\,\frac{kN}{m \cdot s^{-2}}$$

$$G_{tot} = 166259\ kN\ (\sim 20,9\ kN/m^2)$$

c) The base cutting force (for a system with a single degree of dynamic freedom) and the components on the x and y directions (for a system with several degrees of dynamic freedom - real system) are:

$$S = cG_{tot} = 1,2x0,24x2\ ,75x\,\frac{1}{1,5}\,x166259\ = 0,528x1662\ 59 = 87785\ \ kN$$

$$S_x = 59036\ \ kN\ \ (67,3\%)$$

$$S_y = 55346\ \ kN\ \ (63,1\%)$$

Note that direction "X" is the parallel direction to the Lipscani street, while direction "Y" is the perpendicular direction to the Lipscani Street.

d) Lateral displacements

In the group SLS (service limit states) relative level displacements are lower than the maximum admitted (5 ‰) in both directions (1.953 ‰ – in direction X - parallel to the Lipscani Street and 2.660 ‰ – in direction Y - perpendicular to the Lipscani St.).

In the group SLU (ultimate limit states) relative level displacements are lower than the maximum admitted (2.5%) in both directions (0.781% - in direction X - parallel to the Lipscani Street and 1.064% in direction Y - perpendicular to the Lipscani St.).

e) The strength capability of the building, in the two directions, in percents, is:

$R_{3,x} = 53$;

$R_{3,y} = 55$.

Note that direction "X" is parallel to the Lipscani Street and direction "Y" is perpendicular to the Lipscani Street.

The constructive system of the building is strictly "gravitational" without any seismic protection measures. The composition and strength structure of the building do not take into account anti-seismic design principles. In accordance with art. 6.7.1 (2) of Norm P100-3/2008, for assessing the strength capability of the brickwork elements, the Level 1 methodology - simplified methodology was selected.

The construction was not erected on a project basis, as it was built on the basis of the technical knowledge and technological procedures that were specific to the end of the 19th century. Materials were tested and actual conditions in field were taken into consideration (i.e. the technical state of the strength structural after a period of operation - more than 140 years).

In such cases, the calculation models used for simple brickwork walls structures represent, only to a small extent, their actual behavior. The main causes that affect the proper modeling of these structures are as follows:

- the poor quality of component materials (bricks and mortar);
- the poor quality of brickwork walls construction;
- the poor solution for the details of doors and windows empty spaces;
- (probable) random interventions on the strength capability of structural brickwork walls, by breaking / filling in the empty spaces, and by making crevices of large depths;
- seismic actions of the past were handled by mobilizing the 'natural' strength reserves of the brickwork; the cumulative effects of these actions resulted in the decrease of the mentioned reserves.

Moreover, the constructive composition (distance between walls, height standards, constructive system, etc.) does not comply with current rules and norms.

For the evaluation of seismic forces, a very small behavior factor (q = 1,5) was selected, which involves an inductile behavior for structural elements. This selection was based on two considerations:

- the lack of seismic design norms at the time when the building was erected;
- the partial knowledge of the constructive details (intertwining of the brickwork, connection of the brickwork to the horizontal elements, etc.).

There are doubts about the full implementation of the reinforcing project no. 1260/1978, prepared by the “Carpați” Institute of Design. The visual inspection of the building shows the following:

- Stairway no 6 was not made, from the ground floor to the 2nd floor;

- the wall of reinforced concrete, which includes two metal pillars, at the ends, located at the ground floor of the building, on the left side (looking at the building from Lipscani St.), at the narrower end of the building, was no longer made.

Also, over the 1st floor, according to the in-situ inspection (several uncovered areas on the right side of the building - looking at the building from Lipscani St.), the floor is fully made of brick bolts (140 mm thick) and metal profiles type "I".

The strength design no. 1260/1978, prepared by the “Carpați” Institute of Design, does not include the consolidation of vertical elements, except as provided in chapter 9 of this technical expertise report.

In these circumstances, we emphasize that the quantitative analysis (by calculation) are only approximate, for evaluation purposes, and are not precise calculations.

f) Pressures upon the land were calculated for the entire continuous foundations, in groups SLUa, SLSa and SLSc, only about the action of the axial force, at the foundation basis, without taking into account the action of bending moments. In all three cases, checks were not performed.

- Group SLUa 1 and SLUa 2 - the maximal value (ultimate limit states, case a – fundamental group)

$$p_{ef,max}^{N} = \frac{N_f}{A_f} = \frac{277351}{756} = 367\ kN/m^2 > p_{conv} = 250\ kN/m^2$$

- Group SLSa 1 and SLSa 2 – maximal value (limit service states, case a - the characteristic group)

$$p_{ef,max}^{N} = \frac{N_f}{A_f} = \frac{203036}{756} = 269\ kN/m^2 > p_{conv} = 250\ kN/m^2$$

- Group SLSc (service limit states, case c - quasi-permanent group)

$$p_{ef,max}^{N} = \frac{N_f}{A_f} = \frac{193444}{756} = 256\ kN/m^2 > p_{conv} = 250\ kN/m^2$$

In group SLUa, the excess of the conventional pressure value, by about 50%, is due to the partial safety coefficients. At present, the partial safety coefficients of the fundamental group (SLUa) have the following values: 1.35 for permanent actions and

1.5 for variable actions (multiplied by one factor for the group value of a variable action).

In group SLSa, the conventional pressure value is exceeded by about 7%. Currently, partial safety coefficients in the characteristic group (SLSa) have a value of 1.0, both for permanent actions, as well as for variable actions (the latter are multiplied by one factor for the group value of the variable action).

In group SLSc, the conventional pressure value is exceeded by about 2%. Currently, partial safety coefficients in the quasi-permanent group (SLSc) have a values of 1.0 for permanent actions, and to 0.3 ÷ 0.6 for variable actions (in the case of a building subject to this technical expertise report).

A very important aspect refers to the real situation in the field, namely the fact that, after more than 140 years of operation (while the building went through eight major earthquakes), there is no evidence that the foundation soil has given way. This is explained by the fact that the calculated gravitational loads did not actually take place. We noticed that, in the quasi-permanent group - SLSc (the values of this groups' specific actions are closest to the actual situation of operation), the on-land pressure resulted from gravitational loads (N) has an insignificant increase when compared to the conventional pressure (about 2%).

A more accurate modeling of the interaction between structure and foundation land was obtained by considering the build system as a whole, consisting of the superstructure, infrastructure and foundation land. The foundation ground was included in the model as a set of springs characterized by the bedrock coefficient and the possibility of taking only compressive stresses. We made a non-linear analysis for the groups: non-linear - Z – SLUa, nonlinear - Z – SLSa, nonlinear - Z – SLSc, nonlinear - X (+), non-linear - X (-), non-linear - Y (+) and non-linear - Y (-). We thus highlighted the distributions and values of pressures upon the land. The calculation summary illustrates this for the nonlinear - Z – SLSc group.

14. CONCLUSIONS ON THE SEISMIC RISK OF THE BUILDING

After the qualitative analysis and calculations, the following conclusions can be drawn on the seismic risk faced by the building for which this technical expertise is made:

1. For R_1 = 48 the building falls into class RsII of class risk (according to norm P100-3/2008, Table 8.1).

For R_2 = 70, the building falls into class RsII of class risk (according to norm P100-3/2008, Table 8.2).

For $R_{3,x}$ = 53 and $R_{3,y}$ = 55, the building falls into class RsII of class risk (according to norm P100-3/2008, Table 8.3).

The building falls into seismic risk class RsII.

This classification is justified by the following arguments:

a) the overall composition and constructive solutions do not meet the current norms of knowledge and seismic protection;

b) the floors, made of metal main girders, secondary wooden girders and wooden planks (over the 1st and 2nd floors) have a low rigidity in their plane and do not ensure a good connection between the structural walls; under the effect of horizontal forces (including seismic forces), the walls move independently, like consoles, and the danger of collapse is present;

c) the indicator values R_1, R_2 and R_3;

d) the overall analysis of the actual situation;

e) the specifications presented at the end of chapter 13 (points e and f) of this technical expertise report.

In Norm P100-3/2008, art. 8.1 (5) the RsII seismic risk class is defined as follows: the class "which includes constructions that, under the effect of earthquakes up to which it was designed to stand, it can suffer major structural damage, but the loss of stability is unlikely".

2. According to Norm P100-3/2008, it is necessary to reduce the seismic risk of the building, so that intervention works are mandatory. The seismic risk of the building can only be reduced by enhancing the strength and rigidity capability of the structural system, respectively by replacing the current structural system, made of simple/non-reinforced (ZNA) brickwork, with brickwork walls made of lightly confined/reinforced core bricks - ZC/ZIA - by assimilation. The proposed measures are described in Chapter 15 of this technical expertise report.

15. DESCRIPTION OF THE PROPOSED INTERVENTIONS

The works of intervention presented below are a set, and their purpose is to reduce seismic risk, to have certain repairs made and to ensure the normal operation and sustainability of the building.

Two solutions for strengthening the building are proposed: a minimum variance and a maximum variance.

The first strengthening solution will make the needed architectural changes, but the building will most likely belong to the seismic risk class RsIII. This means that, under the effect of an earthquake up to the degree it was designed to stand, the construction may have insignificant structural degradation, but non-structural degradation may be important.

The second strengthening solution will make the needed architectural changes and the building will belong to seismic risk class RsIV. This is similar to constructions where the expected seismic response is similar to that achieved in buildings designed on the basis of current regulations.

Structural interventions provided in this expertize report meet the principles that govern the design of buildings in seismic areas, as well as the status of monument of historical relevance.

15.1 Interventions to reduce seismic risk

Under Norm P100-3/2008, intervention works are necessary to reduce the seismic risk of the building that this technical expertise report refers to.

The following strengthening works are proposed.

The minimal solution

1. In order to increase the *strength and rigidity of the current structure,* the current structural system, made of simple/non-reinforced (ZNA) brickwork, with brickwork walls made of lightly, confined/reinforced core bricks (ZC/ZIA – by assimilation), will be replaced. The strengthening works will be performed by:

- planking brickwork walls (lightly reinforced plasters);
- adding reinforced concrete belts in the floors.

2. In order to increase the strength capability and ductility of the brickwork, the walls made of brick, with a minimum thickness of 280 mm, will be planked with reinforced plasters, as follows:

- on the inside of the outer walls:
    * Thickness 60 mm;
    * cement mortar mark M10;
    * a net Ø8/ 100 S355 - PC52;
- on both sides of the outer walls in the inner the courtyards:
    * Thickness 60 mm;
    * cement mortar mark M10;
    * a net Ø8/ 100 S355 - PC52;
- on both sides of the inner walls, having a thickness of ≥420 mm (where possible):
    * Thickness of 40 mm;
    * cement mortar mark M10;
    * a net Ø6/ 100 S355 - PC52.
- on both sides of the inner walls, having a thickness of 280 mm (where possible):
    * Thickness of 25 mm;
    * cement mortar mark M10;
    * a net Ø6/ 100 S355 - PC52.

The nets will be attached by grips 6Ø6/m² S355 - PC52 inserted in holes that were drilled in the existing wall (Ø10 mm x thickness of the wall - planking on two sides, Ø10 mm x 150 mm - planking on one side); after the insertion of grips, the

holes will be injected with adhesive mortars. Also, every 500 mm, reinforcing elements 2Ø14 S355 - PC52 will be used (plasters that are at least 40 mm thick) or 2Ø10 S355 - PC52 (plasters that are 25 mm thick), which will cross the floors and will be anchored into the belts of reinforced concrete at the top of the walls. The foundations will also be planked.

This strengthening solution does not apply to brick walls that have architectural ornaments (i.e. the central hall).

3. The works for the *rehabilitation of the continuity of the existing brickwork walls* will be made for the brick walls that the strengthening solutions referred to in section 2 above, or the repair measures described in section. 4, below, refer to. These works consist of:

a) removing the plaster and evaluating the deterioration of the brickwork;

b) cleaning the joints at a depth of 10 ÷ 15 mm;

c) repairing cracks by injecting liquid cement;

d) repairing isolated cracks: they will be removed in a strip of 800 ÷ 900 mm (three bricks), following the axis of the crack path, after which it will be rebuilt (with an appropriate interweaving and additions of steel bars into the horizontal joints);

e) repairing multiple cracks that have close paths or in "X": the entire affected area will be removed and rebuilt (with an appropriate interweaving and additions of steel bars into the horizontal joints);

f) replacing broken bricks;

g) replacing all wooden lintels with reinforced concrete lintels (if applicable);

h) replacing corroded metal lintels with lintels made of reinforced concrete, or embedding them (if they are not corroded and there is no other damage) into concrete (if applicable);

i) filling all niches and slits with plain concrete;

j) the rehabilitation measures described above also applies in the case of damage (fissures, cracks, etc.) that was poorly fixed in the past.

4. In order *to increase the strength capability and ductility of the brickwork*, the following works will be made (only for non-structural walls with a thickness of less than 280 mm)

- Planking the sides of the walls with reinforced plaster (cement mortar mark M10 and a net Ø4/100 S255 - OB37) 20 mm thick; the nets will be attached by grips 6Ø6/m² S355 - PC52 inserted in holes that were drilled in the existing wall (Ø10 mm × 150 mm); after the introduction of grips, the holes will be injected with liquid cement.

5. To improve *the spatial connection of the brick walls,* the following works will be performed:

- a review and repair/strengthening of steel girders in all floors (corrosion protection works will be performed, as well);

- floors made of reinforced concrete (concrete C20/25 and steel S345 and S355 - PC52) above the 2nd floor: the plank will be at least 100 mm thick, positioned, by means of a pleated steel sheet, on the current steel girders (the connection

between the reinforced concrete slab and the steel girders will be made by means of connectors), as well as belts with a minimal dimension of the transversal section of 250 mm x 300 mm;

- floors made of reinforced concrete (concrete C20/25 and steel S345 and S355 - PC52) above the 2nd floor: the plank will be at least 150 mm thick, in the areas where there is no steel girder, as well as belts with a minimal dimension of the transversal section of 250 mm x 300 mm;

- a belt made of reinforced concrete (concrete C20/25 and steel S355 - PC52), with a minimal dimension of the transversal section of 250 mm x 300 mm at the top of the brick walls in the attic;

- anchoring the wooden roof structure to the new reinforced concrete belt from the top of the walls, in the attic, where people can enter.

Before performing the consolidation of the floor above the 2nd level, the following elements will be removed:

- the wooden floor - girders and planks meant to support the filling;
- fillers - rubble or slag;
- tile floor (partly made of full brick);
- the false ceiling (plaster on steel wire net and/or plaster board).

After that, the finishing (of the ceiling and floor), as well as the sound and heat insulating layers will be made of lightweight materials.

6. The empty spaces for installations, made in the brick walls and bolts, the following repairs / reinforcing works will be performed:

a) All installations will pass through round steel pipes, and the wall thickness will be of at least 5 mm. Pipe diameters will be strictly limited to the size of installations. At the exterior of the wall, pipes will be shielded by flanges having a minimal thickness of 6 mm and a minimal width of 25 mm.

b) The brickwork surrounding the empty spaces will be restored.

c) The space between the brickwork and the round pipes referred to in point a) above will be filled with a special mortar for repairs (expandable mortar is recommended), so as to restore the continuity of the existing brickwork.

7. Repair works at the wooden frame of the roof (softwood, 1st quality class and 1st class of use) will be made. The roof covering sheet will be inspected and repaired.

8. Repair works of the metal structure of skylights, metal (including corrosion protection works). The covers and glass surfaces of the skylights will be reviewed and repaired.

The maximal solution

1. In order to improve the spatial connection of the brick walls, the following works will be made:

- floors made of reinforced concrete (concrete C20/25 and steel S345 and S355 - PC52) above the 1st floor: the plank will be at least 100 mm thick, positioned, by means of a pleated steel sheet, on the current steel girders (the connection between the reinforced concrete slab and the steel girders will be made by means of connectors), as well as belts with a minimal dimension of the transversal section of 250 mm x 300 mm;

- floors made of reinforced concrete (concrete C20/25 and steel S345 and S355 - PC52) above the 1st floor: the plank will be at least 150 mm thick, in the areas where there is no steel girder, as well as belts with a minimal dimension of the transversal section of 250 mm x 300 mm;

- strengthening current metal girders with belts of reinforced concrete (concrete C20/25 and S345 and S355 steel - PC52) belonging to the floors above the ground floor; the connection between the reinforced concrete belts and steel girders will be done via connectors;

- according to the actual situation in situ, strengthening measures described in the previous paragraph may apply to the floor above the basement;

- belts of reinforced concrete (concrete C20/25 and S345 and S355 steel - PC52) with a rectangular transversal section and minimal dimensions of 250 mm x 300 mm, at the floors above the ground floor and the basement.

Before strengthening the floor above the 1st level, the following elements will be removed:

- wooden floor - girders and planks meant to support the filling;
- fillers - rubble or slag;
- tile floor (slightly reinforced hole);
- false ceiling (plaster made of reinforced wire net and/or plaster board).

Before performing the consolidation of the floor above the ground floor and basement, the following elements will be removed:

- small girders and the wooden floor;
- fillers - rubble or slag;
- wooden floor;
- false ceiling (plaster on wire net and/or plaster board - where applicable).

After that, the finishing (of the ceiling and floor), as well as the sound and heat insulating layers will be made of lightweight materials.

This solution does not apply to floors that were strengthened under project no. 1260/1978, prepared by the “Carpați” Institute of Design (new reinforced concrete floors and steel girders strengthened with reinforced concrete belts belonging to the floor above the ground floor).

2. Points 1 ÷ 8 of the minimal solution will be complied with.

15.2 Interventions on the infrastructure

Minimal and maximal solutions

According to norm P100-3/2008, intervention works are necessary on the infrastructure of the building that this technical expertise report refers to.

To ensure a better transmission of vertical and horizontal actions, from the superstructure to the foundation soil, works for strengthening the foundations are needed. The proposed measures ensure and address any existing damage of the infrastructure.

1. A support board for the basement floor, made of reinforced concrete will be made (concrete C20/25 and steel S355 - PC52) with a minimum thickness of 200 mm. Under the support board, there will be a polyethylene film and a layer of ballast, with a minimal thickness of 200 mm. Next to the brick walls, there will be a belt of reinforced concrete (concrete C20/25 and steel S345 and S355 - PC52). The belt will be at least 600 mm wide, and its height will be determined by the foundation level of the brick walls, i.e. the difference between the upper area of the reinforced concrete slab and the foundation level. The connection between this belt and the existing foundations (made of brick) will be made via connectors of at least 2Ø16/200 S345 (PC52) introduced into drilled holes (Ø18 mm × 300 mm) made in the current brickwork (after inserting the connectors, the holes will be injected with adhesive mortar). The connection between the foundation level and the bottom level of the reinforced concrete slab can be achieved by placing a stair or by making a 45º slope.

By making the reinforced concrete belts, the surface of the existing foundation is widened (strengthening foundations by reinforced concrete veneering).

The strengthening works of the foundations are done only inside.

In the three rooms of the treasury, where, under project no. 145/2002, issued by the REMON PROJECT SRL company, strengthening works were made (reinforced concrete veneering of the brick walls, pouring concrete over the support board of the basement floor and the replacement of the bolt floor made of brick and metal profiles type "I" with a reinforced concrete one), there will be no other interventions (no support board for the floor or belt at the foundations).

2. To remove moisture from the basement, the following measures will be made:

a) The inside of the outer walls will be insulated. It is recommended to use crystallization waterproofing products for bricks, which are applied on the surface of the brick elements, that protect the brickwork in depth.

b) On the outside, all the cracks and crevices of the base will be fixed, and the gaps between the base and the pavement will be closed with permanently elastic putty. In the courtyards, there will be a waterproof sidewalk (where applicable), at least 1.0 m wide, isolated by elastic mastic at the connecting area with the building, so as to direct water outside of the building.

c) All windows and ventilation openings in basement will be fixed. Also, all ventilation empty spaces in the basement will have metal wire nets to prevent animals from entering, as well as tilted blinds to protect the basement from rainwater.

d) As much as possible, the basement will have natural ventilation. Where this is not possible, mechanical ventilation installations will be provided.

e) The drains and gutters will be restored (where applicable).

15.3 Interventions entailing architectural changes

Minimal and maximal solutions

In 2016, during the “ART SAFARI” exhibition, a lot of plasterboard walls were used, both so to create compartments for the paintings to be exhibited and to block light from entering, along the façades of the floors. These walls were not removed then the exhibition ended, and the building was not brought back to its original state. For this reason, all plaster cardboard walls that were used in the exhibition will be removed and the building will be restored to its initial state.

In the case of brick walls where empty spaces will be made, only local constructive measures are required: local reinforced concrete frames or, where appropriate, reinforced concrete lintels. The empty spaces will be grooved manually or by milling, to avoid shocks to the existing structure. Before the breaking begins, the brickwork across the newly created empty space will be supported by placing two metal profiles, on both sides of the wall. These will be strengthened by rods which are threaded at both ends and which penetrate the wall.

In brick walls where the door or window empty spaces will be filled in, the brickwork filler will be intertwined with the existing brickwork. The same is valid for the erection of new brick walls.

The existing brick walls will be stripped in their entirety (except for the façade and the indoor areas that have architectural ornaments). They will be replastered, their cracks or other defects in the brickwork will be fixed (as described in section 15.1 of this technical expertise report).

New plaster board walls will be made, according to the manufacturer's technology.

Repairs to the wooden roof structure and to the metal roof covering will be performed.

16. CONCLUSIONS

The expertise of this building was a complex task, due to the composition of the construction, which does not meet the criteria of the current rules for buildings erected in seismic areas, as well as because of difficulties in calculating the spatial dynamic model of the structure and the true mechanical strengths of the materials.

The building falls in the seismic risk class RsII.

According to Norm P100-3/2008, it is necessary to reduce the seismic risk of the building, which means that intervention works are mandatory. The reduction of the seismic risk of the building can only be made by measures meant to enhance the strength and rigidity capabilities of the structural system, respectively by replacing the structural system of walls made of simple/non-reinforced (ZNA) bricks, with walls made of lightly confined/reinforced core bricks - ZC/ZIA - by assimilation. The proposed measures are described in Chapter 15 of this technical expertise report.

The reinforcing works require interventions of a normal complexity (if such works will not extend to areas having architectural ornaments). The works recommended by this expertise will be expanded and completed during project development phase or during the development of the works proper, only in accordance with the written opinion of an expert.

For the completion of the proposed interventions, the following measures are recommended:

1. Interventions at the strength structure will only be made on a project basis, taking into account the measures referred to in this expertize report. They will be completed, in the areas of degradation or structural changes, depending on the findings during the works.

The reinforcing project will be prepared only after the completion of the architectural and installations projects.

2. The intervention project will be endorsed by the expert and will be double checked by a certified specialist in checking projects, under the law, for requirement A (strength and stability) in the A1 field: "Civil, industrial, agricultural buildings, as well as in the field of energy, telecommunications, mining, utilities and municipal buildings, having a concrete, reinforced concrete, brickwork, wood structure", as well as in the A2 field: "Civil, industrial, agricultural buildings, as well as in the field of energy, telecommunications, mining, utilities and municipal buildings, having a metal, wood strength structure". The intervention project will be endorsed by a certified expert of the Ministry of Culture (specialized in making studies, research and expertizes – requirement A and the field: reinforcing/restoring historic structures - 4) and double checked by a specialist who was certified by the Ministry of Culture (specialization: project auditor - B and field: reinforcing/restoring historic structures - 4).

3. The performance of the works proper can only be entrusted to a contractor that can prove its experience in this type of work. All works will take place under the supervision of a construction supervisor who is certified, under the law, in the field of civil engineering.

4. The contractor will examine the consolidation project and will send their observations to the beneficiary and designer within 15 days from being awarded the project. During the development of the project, the contractor will ask for the approval of the designed for any modifications required by the found situation.

5. The technology of the strengthening works will be implemented by the contractor on the basis of the "Tender Specifications" prepared by the designer of

strengthening works, and it will be approved by the designer. Also, the construction technology adopted by the contractor for the entire building must not cause vibrations, shocks, etc. that could stress the existing building structure beyond the technical regulations in force.

6. For the works to be implemented, the quality performance and management system will be used, in accordance with the law, including the established components for buildings that belong to importance category B.

7. Throughout the reinforcing works, the beneficiary shall ensure the supervision of the works by employing a certified project supervisor, as required by law.

The adoption, during the implementation phase, of solutions that do not meet the conclusions and recommendations of this technical expertise and of the implementation project approved by the expert, is not binding on the expert.

These strengthening works, both in their design and in the implementation solutions proposed by the expert, **do not affect the strength, stability and rigidity of the "Palace of the Dacia former insurance company", i.e. the building located in Bucharest, 18-20 Lipscani St., district 3, or on the nearby construction, i.e. the building located in Bucharest, 16 Lipscani St., district 3**.

Bucharest, October 2017

Drafted by,
Eng. Maria Ruxandra Andriţoiu

Dr. Eng. Tudor Andriţoiu
Technical Expert certified by of the MTCT:
Certificate Series B, no. 06772/2005
Technical Expert Certified by the MC:
Certificate no. 159E/2016



Palace of the former Dacia Insurance Comp.
northern facade
18-20 Lipscani St., District 3, Bucharest



Palace of the former Dacia Insurance Comp.
northern facade
18-20 Lipscani St., District 3, Bucharest



Palace of the former Dacia Insurance Comp.
northern facade
18-20 Lipscani St., District 3, Bucharest



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northern facade
18-20 Lipscani St., District 3, Bucharest



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northern façade
18-20 Lipscani St., District 3, Bucharest



Palace of the former Dacia Insurance Comp.
northern facade
18-20 Lipscani St., District 3, Bucharest


Palace of the former Dacia Insurance Comp.
Southern facade
18-20 Lipscani St., District 3, Bucharest


Palace of the former Dacia Insurance Comp.
Southern facade
18-20 Lipscani St., District 3, Bucharest


Palace of the former Dacia Insurance Comp.
Southern facade
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Southern facade
18-20 Lipscani St., District 3, Bucharest


Palace of the former Dacia Insurance Comp.
Southern facade
18-20 Lipscani St., District 3, Bucharest


Palace of the former Dacia Insurance Comp.
Basement
18-20 Lipscani St., District 3, Bucharest


Palace of the former Dacia Insurance Comp.
Basement
18-20 Lipscani St., District 3, Bucharest


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Basement
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Basement
18-20 Lipscani St., District 3, Bucharest




Palace of the former Dacia Insurance Comp.
Basement
18-20 Lipscani St., District 3, Bucharest


Palace of the former Dacia Insurance Comp.
Ground floor
18-20 Lipscani St., District 3, Bucharest


Palace of the former Dacia Insurance Comp.
Ground floor
18-20 Lipscani St., District 3, Bucharest


Palace of the former Dacia Insurance Comp.
Ground floor
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Ground floor
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Ground floor
18-20 Lipscani St., District 3, Bucharest


Palace of the former Dacia Insurance Comp.
Ground floor
18-20 Lipscani St., District 3, Bucharest



Palace of the former Dacia Insurance Comp.
1st floor
18-20 Lipscani St., District 3, Bucharest



Palace of the former Dacia Insurance Comp.
1st floor
18-20 Lipscani St., District 3, Bucharest



Palace of the former Dacia Insurance Comp.
1st floor
18-20 Lipscani St., District 3, Bucharest



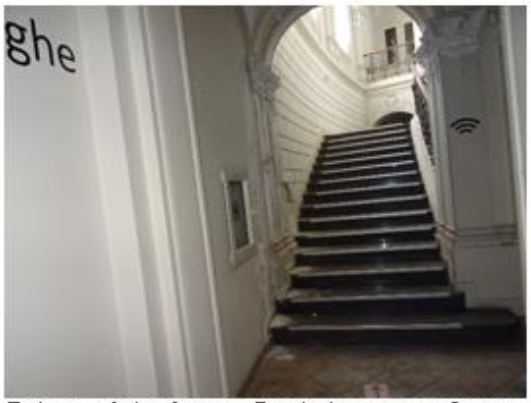
Palace of the former Dacia Insurance Comp.
1st floor
18-20 Lipscani St., District 3, Bucharest



Palace of the former Dacia Insurance Comp.
1st floor
18-20 Lipscani St., District 3, Bucharest



Palace of the former Dacia Insurance Comp.
1st floor
18-20 Lipscani St., District 3, Bucharest



Palace of the former Dacia Insurance Comp.
2nd floor
18-20 Lipscani St., District 3, Bucharest

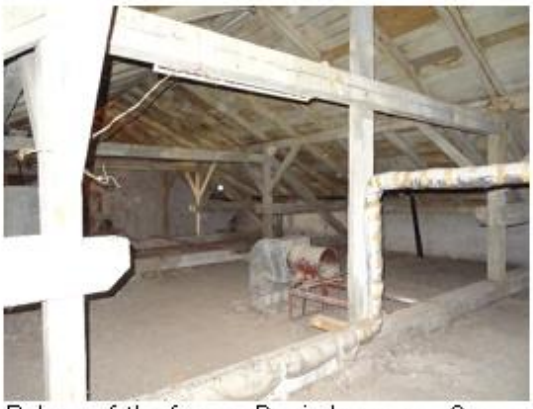

Palace of the former Dacia Insurance Comp.
2nd floor
18-20 Lipscani St., District 3, Bucharest


Palace of the former Dacia Insurance Comp.
2nd floor
18-20 Lipscani St., District 3, Bucharest


Palace of the former Dacia Insurance Comp.
2nd floor
18-20 Lipscani St., District 3, Bucharest


Palace of the former Dacia Insurance Comp.
2nd floor
18-20 Lipscani St., District 3, Bucharest


Palace of the former Dacia Insurance Comp.
2nd floor
18-20 Lipscani St., District 3, Bucharest


Palace of the former Dacia Insurance Comp.
trafficable attic
18-20 Lipscani St., District 3, Bucharest


Palace of the former Dacia Insurance Comp.
trafficable attic
18-20 Lipscani St., District 3, Bucharest


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trafficable attic
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trafficable attic
18-20 Lipscani St., District 3, Bucharest

GEOTECHNICAL SURVEY

ON THE SOIL FOUNDATION CONDITIONS OF THE CONSTRUCTION FROM THE CITY OF BUCHARESTANDTI, 18 – 20 LIPSCANI ST. DISTRICT 3 PHASE: STRENGTH TECHNICAL EXPERTISE ASSET: BUILDING BASEMENT (S) + GF (P) + 2 FLOORS (E)

Cap.1- Introduction. Object of this work

1.1. The object of this work is to provide the geo-technical data of the foundation conditions for a building type S + P + 2E, located at 18-20 Lipscani Street, District 3, Bucharest. This geotechnical survey is performed at the request of SC SACO CONSTRUCT SRL, whose beneficiary is the "Elie Wiesel" National Institute for the Study of the Holocaust in Romania.

1.2. Currently, the assessed location is occupied by constructions (basement, ground floor and two floors). The building has a common (lateral) wall with the building erected at 16 Lipscani Street and at 7 Stavropoleos St.

1.3. The geotechnical research of the land was performed in accordance with the "Norm on the geotechnical requirements and research methods for foundation soil", entry NP 074/2014 and Romanian standards SR EN 1997-1:2006 (Eurocode 7 Part 1, Geotechnical Design, General rules) SR EN 1997-1:2008 (Eurocode 7, Part 2, Geotechnical Design, field investigations).

The calculation of the foundation soil was carried out in accordance with NP 112-2012, red. II and STAS 3300/2/-85.

1.4. The Investigation Program included specific field and geotechnical laboratory works, as follows :

- Field observations;
- Field geotechnical investigations, by carrying out two foundation layer removals, at the basement of the building, uncovering the basis of the perimeter walls, both in Stavropoleos Street (D1 / 2017) and in Lipscani St. (D2 / 2017). See the layout of the area, scale 1:500, attached.
- Field geotechnical investigations, by making a geotechnical pit (F. 1/2017), 6.0 m deep, in the basement of the building. Samples were extracted for laboratory geotechnical analysis;
- The use of archive data on lithology and in situ experiments.
- Laboratory tests on the physical parameters and deformability characteristics;
- Expert documents and analysis on the geological/structural and geologic conditions that are specific to the area where the asset is located, as well as the seismic conditions of the investigated area.

1.5. The aim of the investigations entailed the following objectives:

- To identify the lithology and stratification of the studied site;
- To measure the level where groundwater appears and is stabilized;
- To determine the geotechnical characteristics of the foundation soil;

- To identify the current foundation system;
- To calculate the characteristics of the foundation soil.

Chapter 2 - General data

2.1 **From a morphological perspective,** the studied site is situated in the valley of Bucharest, in the central and old area of the town, in the inter-river area of the Dâmbovița and Colentina rivers, towards the top of the cornice slope area of the Dâmbovița river. This area is characterized by a relatively smooth landscape, with a low energy and slopes that are not prone to rapid geomorphological processes (landslide, accelerated erosion, instability).
The relative height of the land is about +79.41 ++ 79.87 mdMN.

2.2 **Geologically,** the city of Bucharest is placed on a subsistence basin with highly developed sediments, from the Miocene, Pliocene and Quaternary ages, They are unevenly arranged over the Cretaceous foundation of the Romanian Valley. The low depth formations are Quaternary deposits from the Upper Pleistocene sedimentary cycle, consisting of clay deposits (qp3). At the site, the prevailing deposits are brown-gray, made of clay, sandy dusty clay, with limestone disseminations.

2.3 **In terms of geomorphology,** the studied site is located in the Bucharest Valley (a Vlasia-type valley) from the Pliocene-Quaternary, with covered, fragmented terraces and mostly wind-made deposits. Strictly speaking, the construction is located in the inter-river area of the Dâmbovița and Colentina rivers, which is characterized by the presence of a thin package of clays, at the surface (dusty clay layers) deposited over macro-granular layers of sand and stones, known as "the Colentina layers"

2.4 **General hydrogeological data.**
The geological structure of the studied area is composed of two complex aquifers, separated by an acvitard (semi-permeable layer):

- **The higher aquifer,** under partial pressure, going slowly upward, fueled by the rivers of Dâmbovița and Colentina. It is hosted in the deposits of complex N2, which is made of alternating non-cohesive levels with poorly cohesive levels: the (cumulated) thickness of this aquifer varies between 2.0 and + 7,5m. For this aquifer, the groundwater level varies on-site, according to the hydrogeological map of the area of Bucharest, from 6.50m to 7.50m between.

Compared to this level, the groundwater level will vary some ±1.00m, depending on the quantity of seasonal and long-term rainfalls, having a maximum level of 5.50 m.

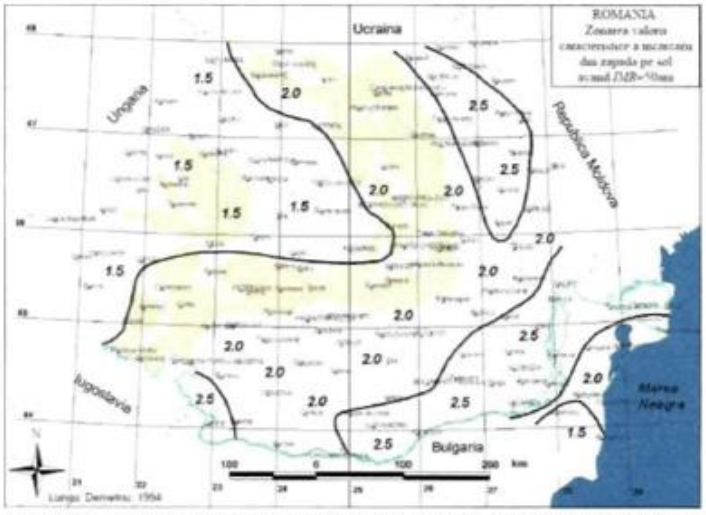
2.5 **As far as the climate is concerned**, the studied area is influenced by continental weather, with very hot summers, not a lot of rainfall, that are usually fast and heavy, as well as relatively cold winters, sometimes marked by strong storms, with frequent periods of warmer weather that cause repeated discontinuities in the snow layer and in the freezing-thaw cycle:

Air temperature:	
Annual average temperature	10.8°C
Average temperature in January	-2.5°C
Average temperature in July	20.8°C
Absolute maximum temperature	41.1°C
Absolute minimum temperature	-30.0°C

Rainfall:	
Annual average rainfall	600 mm
Highest average monthly rainfall	65 mm
Lowest average monthly rainfall	45 mm
Maximum rainfall registered in 24 hours	107,7mm

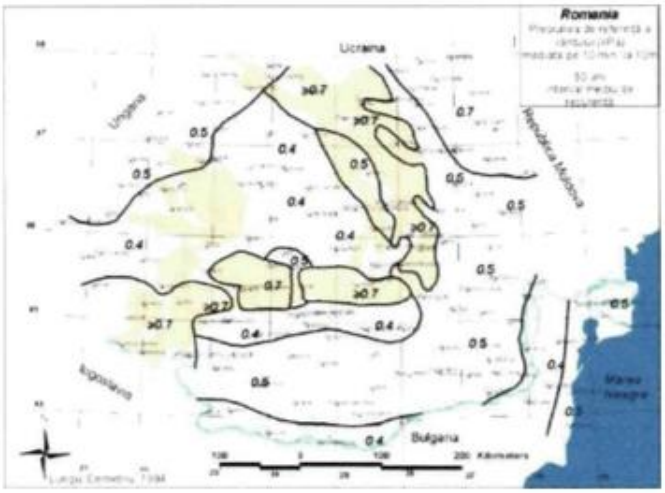
2.5.1 In accordance with the climate distribution map under the Thortwaite humidity index, the area we refer to falls in climatic type I dry-moderate, with a type 2a hydrologic standard.

2.5.2 The first snow usually appears in the last ten days of November and the last one appears at the end of March. **The snow load, under** CR-1-1-3 2012 is sk = 2.0 KN / m²



Map: Romania - mapping of characteristic values of the snow load on the ground So,k, KN / m²

2.5.3 **The reference value of the wind dynamic pressure, under** CR-1-1-4-2012, with a 50 year average recurrence interval, is **qb = 0,5kPa**.
The most prevalent wind blows in all seasons from the North-East.



Map: Characteristic values of the wind reference pressure, averaged over 10 minutes, with a 50 year average recurrence interval (and a 2% annual probability of excess)

2.5.4 **The freezing depth** of the natural ground, according to **STAS 6054-77**, is **0,80-0,90m**.

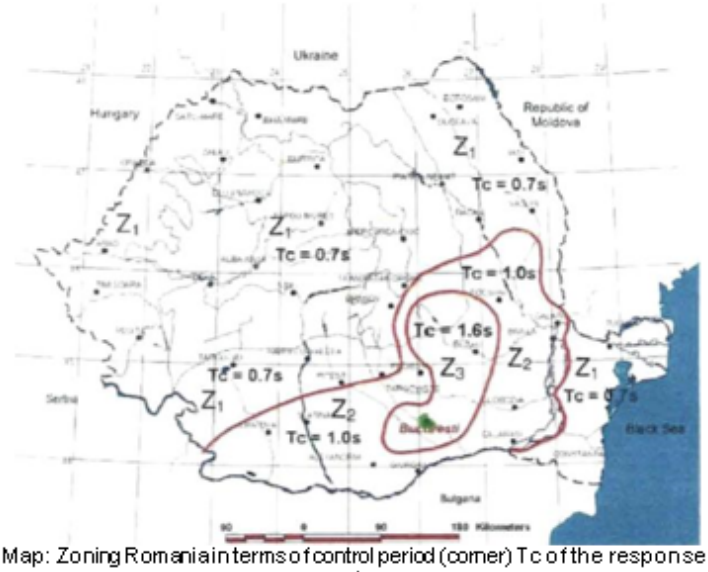
2.6 **In terms of seismicity,** the studied location falls into the macro-seismicity area I=8 on the MSK scale (where index 1 corresponds to an average return period of 50 years), according to SR 11100 / 1-93.

2.6.1 Under norm P100-1 / 2013 the asset is located in an area characterized by peak values of land acceleration, for design purposes ag = 0.30g (ARI = 225 years with a 20% excess probability in 50 years).



Map: Mapping Romania's territory in terms of the peak values of the land acceleration for earthquakes, with an average recurrence interval ARI = 100 years

2.6.2 In terms of control periods (corner) the studied site is characterized by Tc = 1.6 sec.



Map: Zoning Romania in terms of control period (corner) Tc of the response spectrum

2.6.3 Following the analysis of the maximum intensity recorded at the location, caused by the strongest intermediate earthquakes originating from Vrancea, that took place in the last 200 years, it results that the maximum intensity ever noticed at the location was IA = 8.5 (MSK) and was caused by the strong earthquake that occurred in Vrancea in 1802. Also, in the cases of the earthquakes that took place in 1940 and 1977, originating from Vrancea, the intensity at the location was also high: IA = 7.9 (MSK - in 1940) and IA = 7.7 (MSK in 1977). In conclusion, we estimate that the maximum intensity possible in the studied location can be:

IA = 8.5 (MSK)

These intensity values can be linked to a maximum value of the horizontal acceleration (aH) of:

aHmax = 0.26g

We mention that this value of acceleration can be reached in case an intermediate earthquake intermediate takes place in Vrancea, which will be comparable to the one that took place on March 4, 1977 and whose magnitude was Ms = 7.2 (Richter scale).

2.7 In terms of the geotechnical category it belongs to, under norm NP 074/2014, the work that is to be performed falls in "**geotechnical category 2", with a moderate geotechnical risk,** according to the calculation in Table 2:

Table no. 2

Geotechnical Risk Factors Under Addendum B, pt. B3 (NP 074/2014)	Description of the situation in the studied location	Resulted score
Field conditions, pt. B.2.1	Good plots of land	**2**
Groundwater, pt. B.2.2	No dewatering	**1**
Importance of the building, pt. B.2.3	Normal	**3**
Neighboring assets, pt. B.2.4	No risk	**1**

Seismicity	Moderate risk	3
Total resulted score		**10**

Cap.3 - Geotechnical description of the site

3.1 In order to identify the lithology, stratifications, and to determine the geotechnical characteristics of the studied site, we made a geotechnical pit at the location, at the current stage (F.1/2017), having a depth of 6.0m. Samples were taken in order to be tested at the GTF Geotechnical laboratory, certified by MLPAT.

The geotechnical pit was made by using a manual drill equipped with a double-walled sampling tube that allows taking mixed samples.

3.2 The position of the geotechnical works performed at the studied site is presented in the topographic layout, at a scale of 1/500, attached to this memo.

3.3 The following presents the stratification of the land and the groundwater level:

Drilling depth / year of performance	Drilling depth (m)	Filler base (m)	Clay batch base (m)	Sand batch (m)	Groundwater level (m)
F.1 / 2017	6.0	2.90	3.90	> 6.0	-

3.4 Samples were taken from the pit in order to be tested in the geotechnical laboratory. Based on the results of the lab tests, we found the normal values of the physical and mechanical features of the ground in the area of influence of the foundations.

The **geotechnical features** of the foundation ground were found in the geotechnical laboratory, under the specific standards in force, as follows:

- **STAS 1243-88** - Classification and identification of lands,
- **STAS Series 1913/1** - Determination of humidity,
- **1913/2** - Determination of the land frame density,
- **1913/3** - Determination of land density,
- **1913 / 4** - Determination of plasticity limits,
- **1913/5** - Determination of granulation,
- **STAS Series 8942/1** – Determination of land compressibility by edometric tests.

The laboratory results are presented in short in the records of the geotechnical pit that was made in the current stage, attached to the geotechnical memo.

> From the current ground level to a depth of 2.90 m, we found earth filling with fragments of bricks and traces of coal.

> After the depth of 2.90 m, we found consistent sludgy, dusty clays, yellow-brown-gray plastic clay powders that indicate the presence of re-formed ground, which is a specific feature of inter-river areas;

3.5 The samples taken from drilling F1 / 2017 and from the foundation land, during the layer removal D2 / 2017, were tested in the certified GTF geotechnical laboratory.

3.6 Based on the geotechnical parameters resulted from the laboratory tests, the ground that was sampled at a depth of more than -4.50 m, made by batches of gravel sands, in the inspected site, can be characterized as follows:

Geotechnical feature	**Foundation ground** - Laboratory results	**Land type**
By the granulo-metric composition:	Dust % 6-18 Sand % = 11-31 Gravel % = 2-18%	Sandy dust, sand with small / large stones, which are non-cohesive lands
By volumetric weight By porosity By moisture	rw = 19,1-19.4Kn / m³ n> 38.40% w = 16.2-18.0%	Consolidated lands Consolidated lands Consolidated lands
By the compressibility means M2-3	M2-3 = 225.0 cm²	Lands having a low compresibility
after the moisture content Sr	Sr = 0,73-0.79	Dry lands at the environment, over the ground water level
Please note that some of the data was taken from archive documents, from drillings that were made in the immediate vicinity of the studied site		

Chapter 4 - Groundwater

4.1 The groundwater level was not reached when drilling F1 / 2017 was made. Given our archive documents and the drillings that were made nearby, we conclude that groundwater was found at an approximate depth of 7,30- 7,40m, depending on the ground level. When considering this level, the groundwater level may vary by ± 1.00 m in times of heavy rainfall that last longer; in the design process, one will consider the maximum level of -5.50 m.

4.2 Water samples taken from the area, tested in specialized laboratories, showed, under the current STAS 3349-83, that the water has a weak carbonic wear factor against the concrete. The water has a strong wear factor against metals, under Norm I 14-76. According to Norm NE 012-1 / 2007, the water falls under class XA1 (weak chemical wear factor).

Chapter 5 – Conditions of foundation

5.1 Geotechnical features for calculation

For the calculation of the load capacity and settlement of the foundation land, we set the calculation values of geotechnical characteristics, under NP 112/2012, red.II and STAS 3300 / 1-85, Addendum A.

5.2 Considerations on the identification of the foundation level

The identification of the foundation level depth is one of the basic issues to be addressed, as well as setting the conditions of safety and stability for the current building located at 18-20 Lipscani Street.

There are many factors that determined the choice of the foundation level, and they can be grouped as follows:

A. **External factors,** that may unfavorably influence the stability and strength of the foundation land, such as:
   - temperature variations;
   - the freezing – thawing phenomenon;
   - rainfall;
   - water infiltrations;
   - the speed of the water flow and infiltrations (see the area of dusty clays)

   The freeze-thaw phenomenon is one of the factors that have a great impact on the behavior of the construction in time, due to the fact that, when freezing occurs, some categories of ground materials increase their volume.

   Thus, the studied area is comprised in the geo-isotherm 0.90, i.e. the freezing depth of the city of Bucharest is 0.90 m from ground surface.

B. Another factor used in determining the foundation level refers to the functional conditions and the technological use of the construction, which was established by the general designed.

C. The nature of the foundation soil, outlined by the layer sequence both in the geological drilling and in the foundation layer removal made at the current stage of the survey, as well as the strength and stability properties of the layers that make up the foundation soil.

D. The calculation of the foundation depth was imposed by the uniformity and load capability of the foundation land. From the geotechnical perspective, it is important to place the foundation upon a layer of ground that can effectively support the pressure of the foundation imprint, as it is transferred by exterior loads.

   Given our design topic, we propose the following:

E. Calculation of the foundation soil, under STAS 3300 / II - 85 in the case of a direct foundation at a depth of – 4.50m from the ground level. The resulted limit pressure was Ppl = 350kPa, which is the same as the limit pressure for normal use.
   The pressure at the latest limit state has a value of 410 kPa.

   Given the geotechnical situation encountered on site and the data of our topic, we have the following observations on the foundation conditions:

F. The in situ foundation [building type Basement (S) + GF (P) + 2 Floors (E)], with a brickwork base, was made directly, starting at a minimal depth of -4.50m (from the ground level), on continuous imprints, supported on a bed of brick having a thickness of -0.50m in the area of the Stavropoleos Street (see layer removal D1 / 2017, sections and ground photos, in the area of the existing basement). We considered that, in order to avoid the appearance of a stepped foundation, caused by the difference in the level of Lipscani Street (79.83CT) and of Stavropoleos Streey (79.41CT), and in order to make the foundation on the same type of layer, the builder used a (partial) bed of brickwork in order to support the difference of level. This way, vertical foundations had the same level

and depth on one façade (Lipscani Street) and in the other (Stavropoleos Street).

G. Under STAS 3300 /II-85, the effective pressure upon the ground will be Pef ≤ 260KPA (2.6daN / cm²).

H. The final calculation is up to the specialized engineer.

5.3 Adopted foundation system

The role of foundation is to take the loads of the structure above and pass them on to foundation soil. **In the case of the studied site (building Basement + GF + 2F), the designed used continuous imprints that are supported by the layer of dry, locally compacted gravel sand, as well as a layer of brickwork placed upon the same gravel sands.** Their role is to help the load of the structure, that is put upon the foundation soil, provide the proper conditions of stability, strength, safety and a good operation in use, so as:
» not to exceed the bearing capability of the foundation soil;
» not to lead to vertical deformations that are not allowed by the structure and operation of the construction;
» internal tensions, of stretching and compression, that may occur in the body of the foundation will not exceed the strength capability of the material they are made of.

The foundation system adopted in situ will be evaluated by the strength designer from the technical and economical perspectives, depending on:
» the use and importance of the building;
» the nature of the land, as described in the intercepted lithological profile, with the proper sequence of layers and the geotechnical parameters of the layers of ground under the foundation level, which determines the conventional calculation pressure;
» the size and nature of the loads;
» the neighboring buildings.

5.4 Calculating the foundation soil

The foundation soil of the analyzed site consists, in depth, of sand with gravel having an average degree of compactness, followed, in the upper area of the layer, by a batch of dusty clay which is semi-consolidated and has an average degree of compressibility.

In order to calculate the foundation soil features, one will use the following values:

THE BATCH OF COLENTINA LAYERS

> Angle of internal friction.....	$\phi = 29°$
> Cohesion.....	C = 0KPa
> Volumetric weight.....	γw = 19,5KN / m3
> Bed coefficient	Ks = 10daN / cm3,
> Permeability coefficient	k = 1.50x10⁻ 1 cm / s
> Conventional pressure.....	Conv. pressure = 250 kPa (2,5daN / cm2)

FOR THE CALCULATION OF THE LOADS RESULTED FROM THE GROUND BULK (filled in materials)

> Volume weight ..... γw = 1.6 t / m3
> The angle of internal friction..... ϕ = 10°
> Cohesion ..... c = 5kPa

Chapter 6 – Conclusions and proposals

6.1 The geotechnical survey performed in the phase of Strength technical expertise can be completed and detailed, **where appropriate**, at a later phase, when the geotechnical survey becomes final!

6.2 Recommendations

6.2.1. If digging is to be performed, a geo-technician will be asked to identify the nature of the foundation soil, in order to detail the geotechnical survey.

6.2.2. In case digging is performed, proper support measures will be made, both for the earth embankment and for the stability and protection of the current brickwork of the constructions.

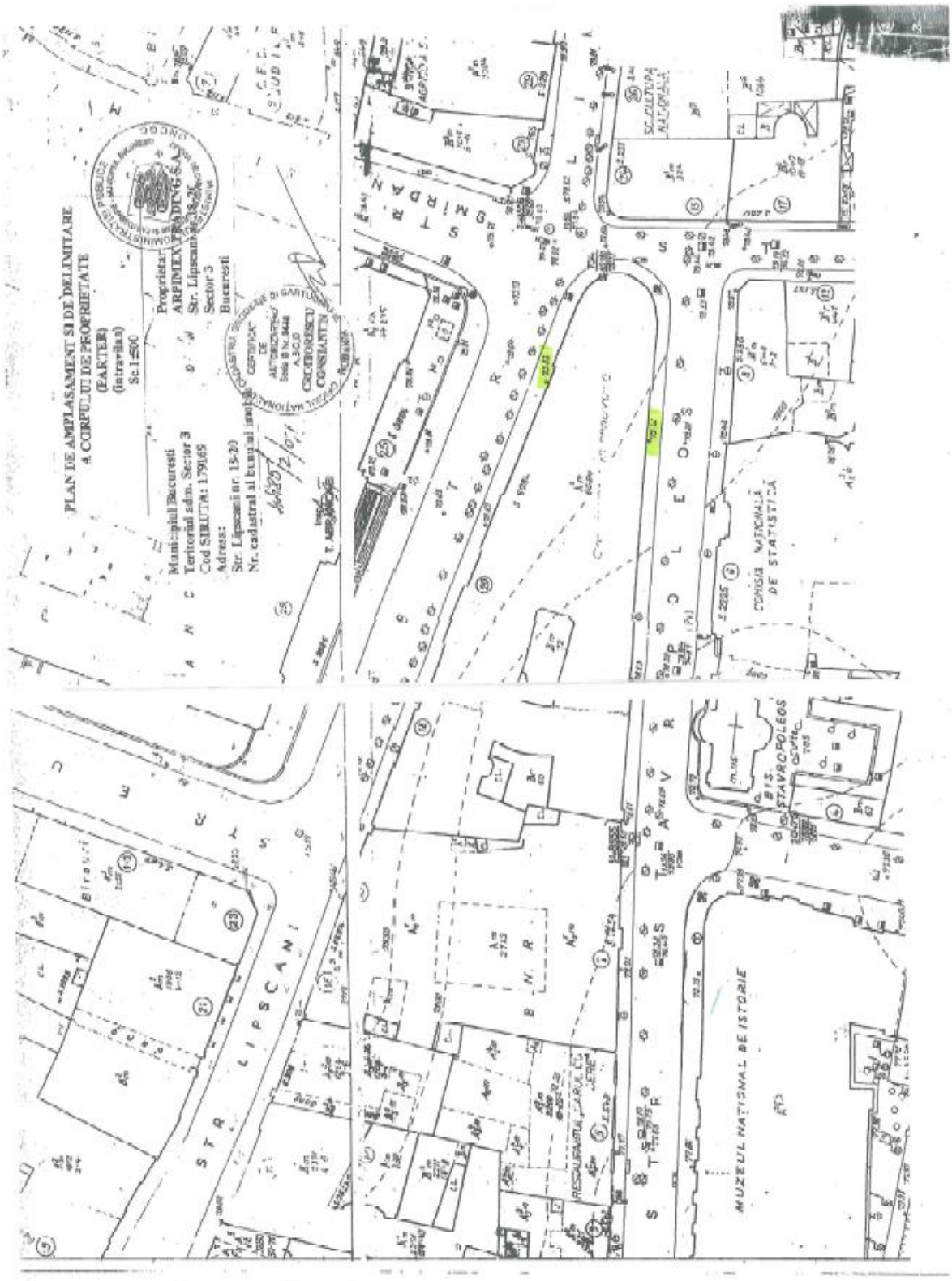
6.2.3. Under the TS norm entry, in case of mechanized digging, the land will be considered as belonging to class II. In case of manual digging, it will be considered as belonging to the "hard" category.

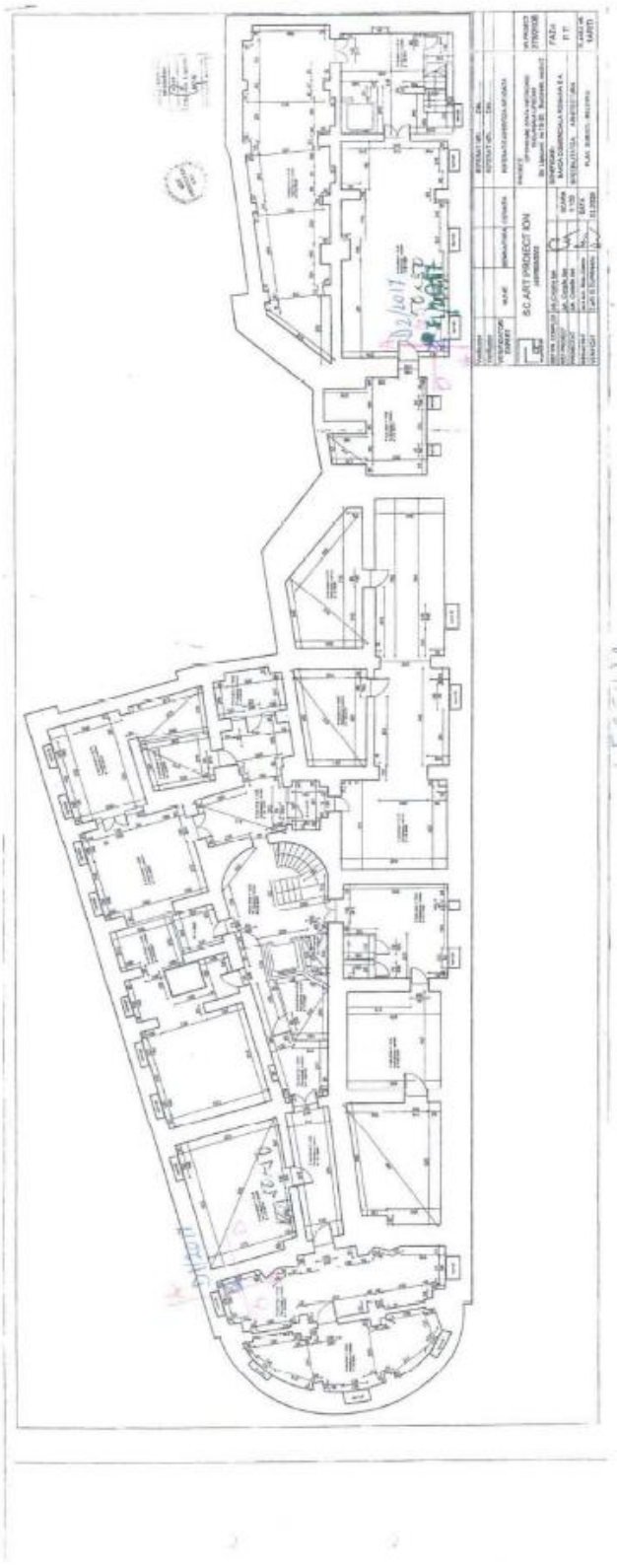
6.2.4. If considered necessary, when starting foundation diggings, one will summon a geo-technician in order to check and approve the nature of the foundation soil.

SEPTEMBER 2017

Dratted by
Geo-tech. MIHAI DIMOFTE


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TEATRUL
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STRADA FILITTI C. ION
P.I.A.T.C. CASANDRA


PLAN DE AMPLASAMENT SI DE DELIMITARE
A CORPULUI DE PROPRIETATE
(EARTER)
(intravilan)
Sc.1:500
Proprietar:
ARFIMEX TRADING S.A.
Str. Lipscani nr. 18-20
Sector 3
Bucuresti
Municipiul Bucuresti
Teritorial adm. Sector 3
Cod SIRUTA: 179165
Adresa:
Str. Lipscani nr. 18-20
Nr. cadastral al bunului imobil
STR. LIPSCANI
STR. SMIRDAN
STR. DOAMNEI
STR. STAVROPOLEOS
MUZEUL NATIONAL BE ISTORIE



ARCHITECTURAL MEMO
BACKGROUND DATA

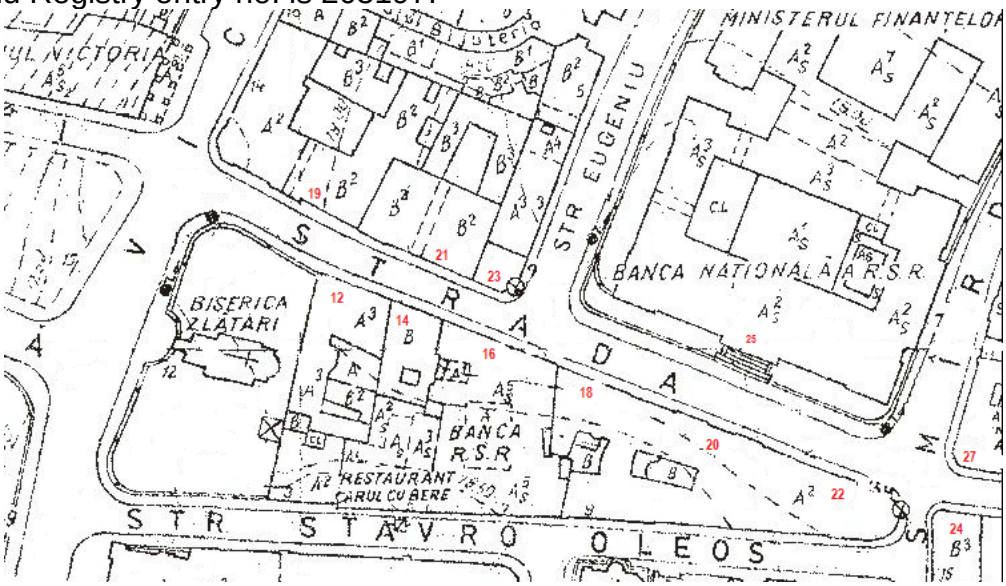
Studied building



The building is located in Bucharest, 18-20 Lipscani St., District 3, Bucharest.

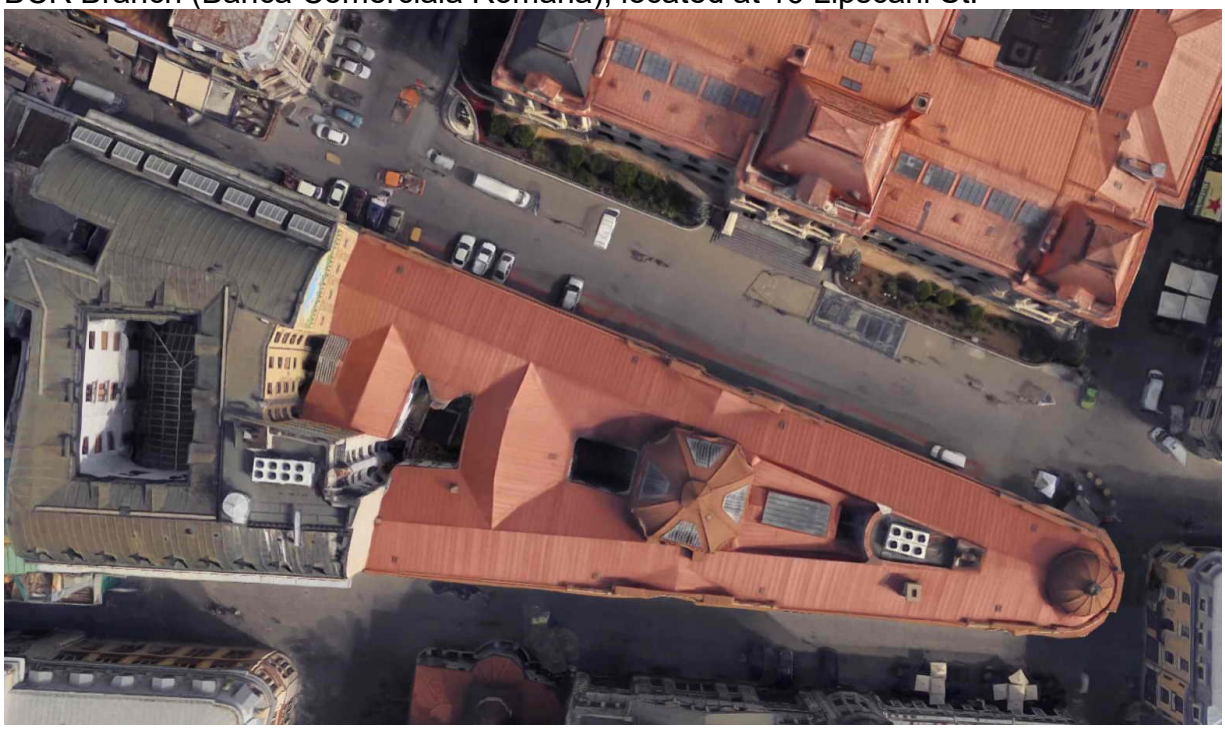
It is managed by the „Elie Wiesel" National Institute for the Study of the Holocaust in Romania.

Its Land Registry entry no. is 205197.



1. LOCATION

The building is located in the historical center of Bucharest, at 18-20 Lipscani Street, in front of the building of the National Bank of Romania. The access into the building is made from this side. There currently are five doors, with varying degrees of visibility into the main façade.
On plane, the building has a triangular shape, with a rounded corner towards the Smârdan Street, but also having a side onto Stavrolpoleos Street. There are 5 access doors on this side.
The third side is a blind wall, which connects the construction to the building of the BCR Branch (Banca Comercială Română), located at 16 Lipscani St.



2. USE

Two institutions currently operate in the building. The smaller, western side, is occupied by a branch of CEC Bank and the remaining of the building will host the History Museum of the Jews in Romania. By the Government Decision no. 625/2016 and the Decision of the Bucharest General Council no. 285 of 09/29/2016 the venue is managed by the „Elie Wiesel" National Institute for the Study of the Holocaust in Romania, in order to make the museum.

3. SHORT HISTORY

a. CONSTRUCTION OF THE BUILDING

NOTE - Not to be confused with another Dacia Palace, located not far from there. That one was designed by architect Alexandru Orascu and built in 1874 at the intersection of the Mogosoaia Bridge (Calea Victoriei of today) and Lipscani Street, on the site of the Filipescu Inn.

The building in Lipscani 18-20 was built at the end of 19th century to host the headquarters of the Dacia - România Insurance Company. The selected site was in an area that already had and would continue to have buildings used in the banking and financial segment, forming a center / core that had / has this purpose.



The Dacia Palace in 1904 - Zentlerai

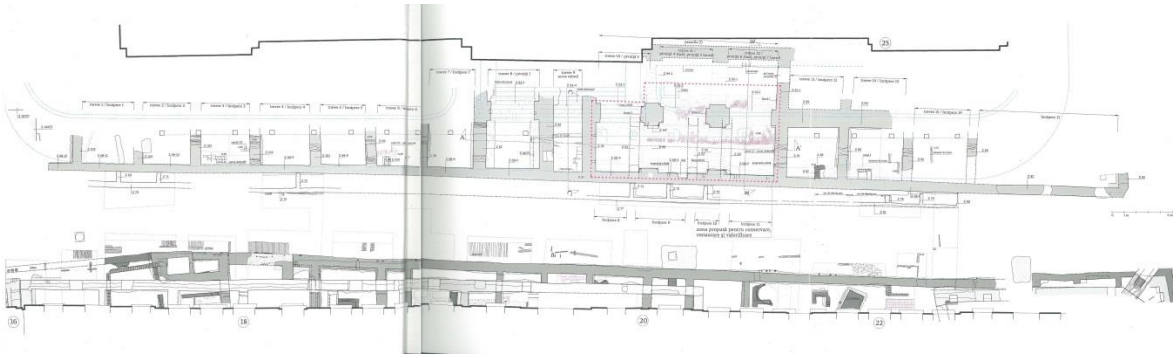


The NBR Palace in the 1920s from Lipscani St. –
in the distance, the **Discount Bank** Palace

As it happened to other buildings erected during that time and in that area of the city, it was placed on a spot where another buildings existed before. The Grecilor Church and Inn, whose ruins were preserved under the Lipscani Street and partially uncovered in 2008 -2009, during works carried out by the Bucharest Municipality, had been there before. Today the line of the old walls is discreetly marked on the street pavement.



The Greci Inn ruins and façade, 18-20 Lipscani St., 2007 by flickr - E. Nicolau



Profile of the Lipscani Street between the building of the NBR and the Dacia Palace, marking the ruins of the Şerban Vodă and Greci inns - (*Palatul Vechi-Palatele Bancii Nationale a Romaniei. Vol I. Palatul Vechi* – The Old Palace – Palaces of the National Bank of Romania Vol I. The Old Palace, **Authors**: Isărescu M. Mariţiu, S., Cîrjan, R.)

The "Vasile Pârvan" Institute of Archeology, Bucharest – the Museum of Bucharest (Adina Elena BORONEANŢ, Elena GAVRILĂ, Andrei Mircea MĂGUREANU, Gheorghe MĂNUCU- ADAMEŞTEANU, Cristian NESTORESCU, Raluca-Iuliana POPESCU, Dorin SÂRBU, Meda TODERAŞ, Mihaly-Tibor ZAMBORY) **the year 2007**.

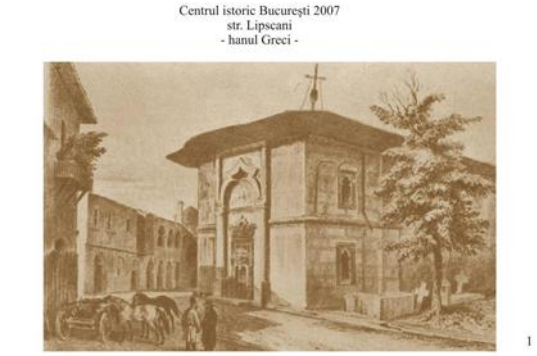








Figura 1
1 Biserica şi hanul Greci (A. Raffet 1837); 2 detaliu din planul Borrozyn (1846 - 1850)

Figura 3
1 - 2 Hanul Greci: aspecte de săpătură

Top left picture: The Historical Center of Bucharest, 2007, Lipscani Street, the Greci Inn
Top right picture: The Historical Center of Bucharest, 2007, Lipscani Street, the Greci Inn
Bottom left picture: Figure 1. 1 The Greci church and inn (A. Raffet 1837); 2 Detail of the Bozzoryn plane (1846 - 1850)
Bottom right picture: Figure 3. 1-2 The Greci Inn, picture taken during the digging period

The Greci Inn.
This inn could have been considered one of the great buildings of this kind, in Bucharest, which had a church in their midst (.....) By the late eighteenth century, the inn had 13 shops at the ground floor, while the bedrooms were upstairs. (... ..) The demolition of the Greci Inn was carried out in 1863. The land was bought the Dacia Română Company on July 9, 1882, which erected the building that currently hosts the BCR branch."



Figura 2
Planul săpăturilor arheologice din jumătatea sudică a străzii Lipscani

The Historical Center of Bucharest, 2007, Lipscani Street – the segment between Eugeniu Carada and Smârdan Streets.
Figure 2. Plane of the archeological diggings in the southern half of the Lipscani Street

b. OTHER USES IN TIME



Banca Generală Română (The Romanian General Bank) - about 1920



Advertizing banner – M. Finkels, trousseaux by Jean Poloni
We note that various compartments made it possible for several shops to operate at the ground floor. We can see their ads. At one point, the *Banca Generală Română* (Romanian General Bank) was at the corner.

Data on the history and use of the building located at 18-20 Lipscani St. are few and difficult to find.

During the communist regime, its use had changed. There were various shops at the ground floor; perhaps there were offices, upstairs.

After the earthquake of 1977, the building was subjected to a strengthening / restoration process. Moreover, the interior area was reshaped as we find it today. Due to the richly decorated façades and the octagonal hall in the center of the axis, the authorities of the time considered it suitable to host a luxury fashion house. The ground floor hosted shoe stores, while the other floors hosted design and clothes workshops. In the current area of the CEC Bank, a unit of public alimentation was opened, which later became a self-service restaurant; thus, its function was preserved.



1988 Fashion House

After 1990, the building regained its banking use. Until 2013, it was occupied by a major BCR office. The self-service restaurant became a CEC Bank, at the time, too. Thus, the restoration of the banking center began again, in the same place.
The building came into the possession of the City Hall in 2013, after an exchange agreement, and it will now be refurbished and given a new use.

4. DESCRIPTION OF THE BUILDING

a. SHAPE ON PLAN



The BCR branch during the excavations in Lipscani Street, in 2008-2009

The shape on plan of the building is that of a sharp triangle. The tip of the triangle, which is located at the intersection of Lipscani, Stavropoleos and Smârdan streets is rounded and richly ornamented at the façade. It also has a round dome over the roof and is decorated with statues.

Given the need to ventilate the premises, three atriums for light were designed along the bisector of the sharp angle, while the plan continues almost symmetrically. Two of these small courtyards were covered in time (skylights over the 1st floor), while the smallest remained open for the ventilation of toilets.

A fourth atrium for light was designed at the area of the blind wall, by the proximity of the NBR / Chrissoveloni building. There is a skylight over the ground floor where the CEC branch operates.

Over the (approximate) center of gravity of the triangle, as well as in the area and in the axis of the main entrance, there is an octagonal dome that marks the entrance into the building. It was designed so to mark the symmetry of the façade.

This feature is also meant to mirror the NBR building, located on the other side of the street. The two entrances are almost face to face. The dome covers a high hall which unifies the space vertically, that is the ground floor and two other floors.



The statuary group located on the dome at the intersection of Lipscani, Stavropoleos and Smârdan Streets



CEC Bank - located at the western end of the building





The Dacia Palace towards the Stavropoleos St. - views in both directions

b. DIMENSIONS FOR THE ENTIRE BUILDING, INCLUDING AREA UED BY CEC BANK

It is an imposing building which stands out not only due to the decoration of the façades, but also to the large area is occupies **(about 2000 sq.m. at ground level).**
The length of the façade in the Lipscani Street is **96.20 m**, while that in the Stavropoleos St. is **85.80 m.** The shape of plane is a bit asymmetric because of property limits.
The façade on Lipscani St. keeps the same horizontality throughout the length (level ± 0.00), while the base of the façade on Stavropoleos St. descends along the slope of the street, by approximately = 1.10 m.
Vertically, the building has a ground floor and two other floors (**$h_{corniche}$ = 13,80 m** and h_{ridge} = 17.00 m), as well as an attic which is not being used. The basement goes along the whole building.

SURFACES
Total built area = **7973 square meters (without the unused area of the attic)**
Ground floor built area = **2137 square meters**
1st floor built area = **1946 square meters**
2nd floor built area = **2061 square meters**
Basement built area = **1829 square meters**

FLOOR HEIGHTS
Heights between different levels (between the boards, finite level)
Between the basement and the ground floor = 3.86 m
Between the ground floor and the 1st floor = 4.55 m
Between the 1st floor and the 2nd floor = 4.30 m
Between the 2nd floor and the attic = 4.45 m

Approximate (variable) free heights for each level
H ground floor = 4.00 m - 4.62 m
H 1st floor = 3.75 m
H 2nd floor = 3.55 m
H of the basement = 3.38 m

c. ENTRANCES
The main entrances, that were used in time, are those from Lipscani Street, although the façade on Stavropoleos St. is as beautiful and carefully designed. True, the width of the street does not entail the same visibility of the façade and the number of pedestrians is lower.

d. COMPARTMENTS AND USES, BY FLOORS

The basement has thick walls and small rooms that were used as technical or storage areas. It is totally buried below street level, without natural light, but has ventilation holes drilled into the thick outer walls. They can be seen in the facades (rectangular holes) upon the parapets of the high windows of the ground floor.

The ground floor has large, open spaces, and several entrances along both streets. It is designed so as to allow the entry of people from the street, as well as to make compartments of the space, as needed.

The 1st floor contains larger or smaller spaces, developed around the central octagonal hall. After the strengthening interventions (made under the design of the Carpați Institute) new stairways were introduced, as well as two narrow walkways. These are the only parts that ensure a continuous horizontal passage (from the left to the right of the hall) at this floor.
Two small elevators were introduced at the time, but they are currently out of order.

The 2nd floor has both large or small rooms, and also stands over the area currently operated by CEC Bank. However, this area is divided into two parts, without horizontal left / right continuity. It is necessary to descend and climb another stair to move from one part of the floor to another. Following the intervention of the 1980s, there are four access stairs now, two on each side. This floor has skylights for two patios.

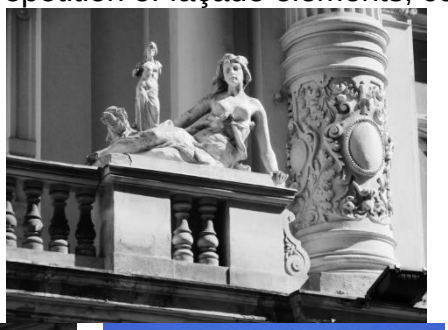
The attic can be accessed via two stairways (secondary ones, erected during the strengthening procedures) that go up to the winch room of each of the two elevators. The remaining space, with the visible wood structure and different heights, is not used.



2010 BCR Lipscani branch

e. ARCHITECTURAL STYLE AND DECORATIVE ELEMENTS

The Dacia Palace is built in an eclectic style, with heavily decorated facades and window frames, marked by cornices and floor registers, connector bosses that imitate stone (inspired by the Renaissance), classical (Doric, Ionic and Corinthian) columns, numerous sculptures, symmetry and entry areas accentuated in height. The classical and neoclassical styles inspired the building design as follows: rigor, symmetry, the repetition of façade elements, columns, frontons, sculptures.

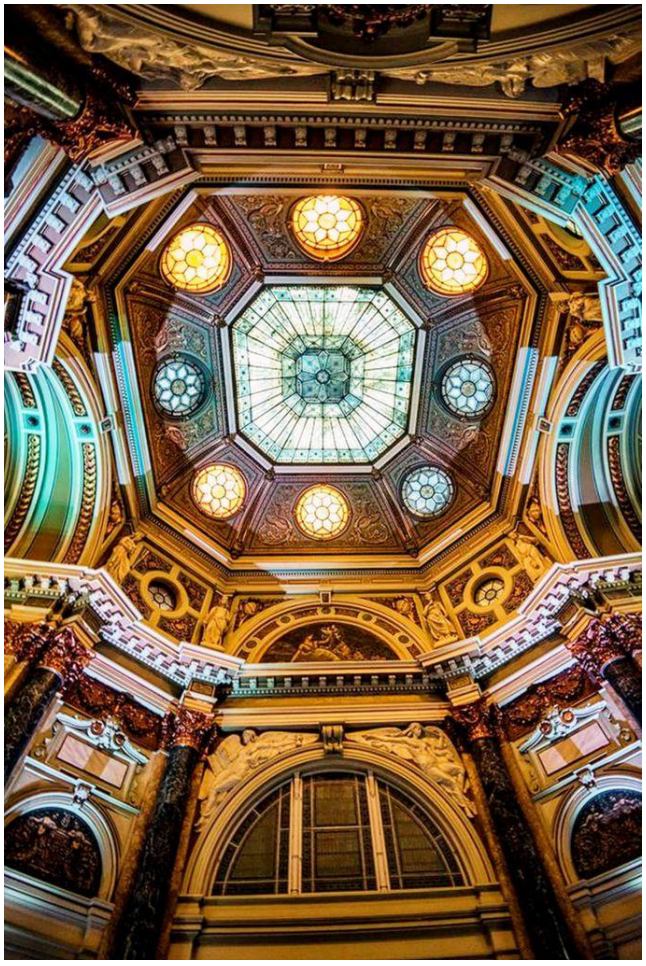







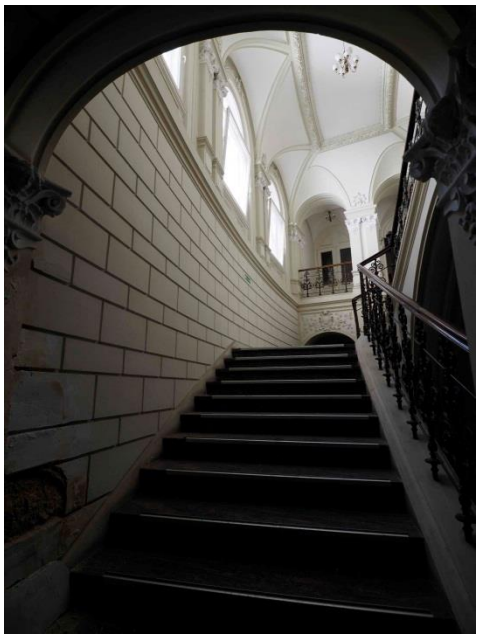
Interestingly, the corner at the intersection of the three streets is lifted up by using a round domes that puts emphasis on the area. The main entrance is marked by the raised central dome (double - as a technical design solution, perhaps inspired by Brunelleschi's Dome of the Florence's *Duomo* or by that of C. Wren at St. Paul's Cathedral, London) by using an ingenious indirect illumination system, which makes the central skylight and eight round stained glass windows.

Although inspired by classical elements, the interior decoration, in particular the octagonal, three-level hall gains baroque influences due to the dimensions of the venue, the color and contrasting light, excess elements, the use of stucco and marble imitation, as well as the use of a mixture of painting and architectural elements, such as round stained glass skylight areas.



The three level octagonal hall

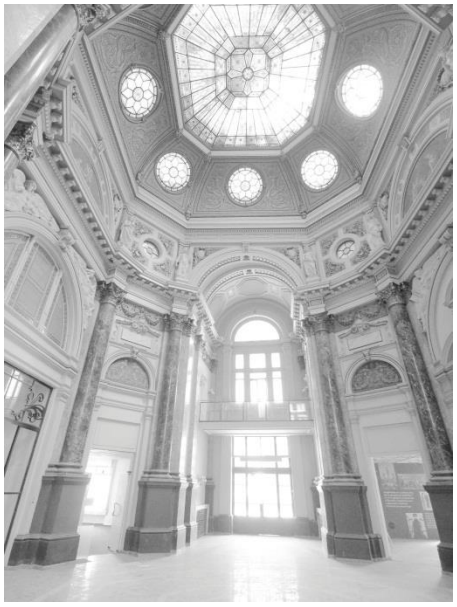
The marble stairs to the right of the main entrance, classically decorated, with straight, firm steps resisted in time. The walls have stucco classical decorations on the walls, with floral models or false Ionic or Corinth pillars, round plaster frames stuck into the walls or at the edge of the empty spaces, as well as wrought iron railings with floral motifs.




Marble staircase with steps in four ramps, walls with plaster decorations

f. MONUMENT OF HISTORICAL RELEVANCE

The palace of the Dacia - România former Insurance Company
Address: 18-20 Lipscani St., District 3
Address: Bucharest
Region: Wallachia
Category: Palaces
Period: The 19th century
Importance: A
LMI Code: B-II-m-A-19021





Descriptions / Comments



Silvia Colfescu - *Bucureşti: ghid turistic, istoric, artistic – Vremea* (Bucharest: tour guide, history, art – the Vremea Magazine, 2009 Dec. 16, 2009

"Opposite the National Bank, there is one of the most decorated buildings on Lipscani St., the former General Bank (no. 18-20), where a banking institution operates, currently. The building was built between 1910-1913, for the Dacia insurance company, and restored in the 1980s.

Occupying the corner between the Lipscani, Smârdan and Stavropoleos streets, the building also has a long façade on Stavropoleos Street. The exceptionally rich decoration is neoclassical, with Renaissance elements. The windows of the first floor have frontons that stand on Ionic columns; the whole entrance is accentuated by Doric columns at the ground floor and by Ionic columns at the upper floors, surrounded by high Corinthian columns. The entire facade is adorned with busts in medallions and groups of characters, all in cameo. On the corner between the three streets, the building is crowned with a dome that has a group of characters on top. The interior of the building is as sumptuous as the exterior: the main hall, open on three levels, is covered in marble, as well as gilded stained glass and ornaments; the light passes through an octagonal skylight.

**** NOTE - This source (Silvia Colfescu - Bucharest: tour guide, history, art) is one of the few that we have. It may be insufficiently documented and often quoted.***

***** NOTE - Other sources (IP Carpathians 1978, project memo) mentions that the building was erected in 1880-1885, but does not say the name of the architect, either.***

5. BUILDING MATERIALS

The building is made of brick and mortar of very good quality. The engineers who checked the building after the 1977 earthquake considered it was of "exceptional" quality. The construction work was considered equally good, thus explaining its good behavior when earthquakes took place. When making the current sketch to scale, we found there were very small deviations in the flatness of the walls and the empty spaces of the façades were very uniform, so that we acknowledged with respect the seriousness of the workers.
The floors were made of brick bolts laid on metal profiles, with rubble filling. In some places, the used solution was that of metal main girders, wooden secondary girders and rubble filling.



Ceiling made of brick bolts and a structure for cardboard drywall

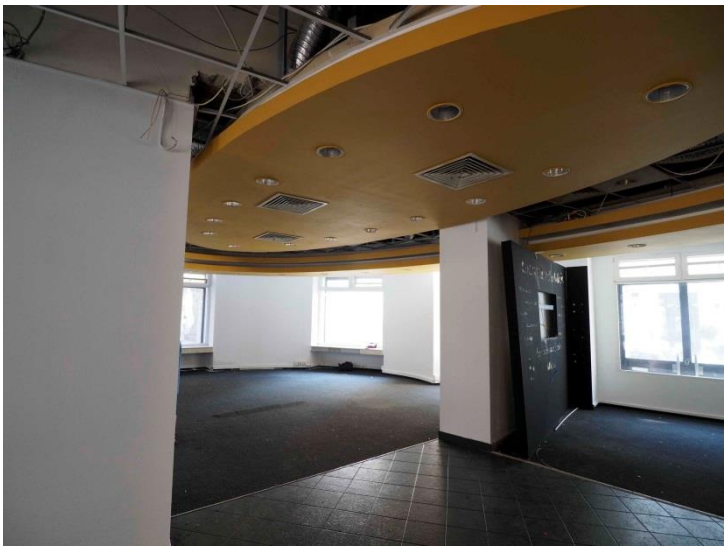
The original ceilings were covered by plastered cane. Currently, there are additional large areas of lowered ceilings made of cardboard drywalls.

The interior decorations are made of plaster and stucco. They were made properly and are in good condition. Next to the stairway having steps in four ramps, the arches are made of metal nets ant the decorations are made of plaster.

The façade is made of plaster and the base of split tiles.

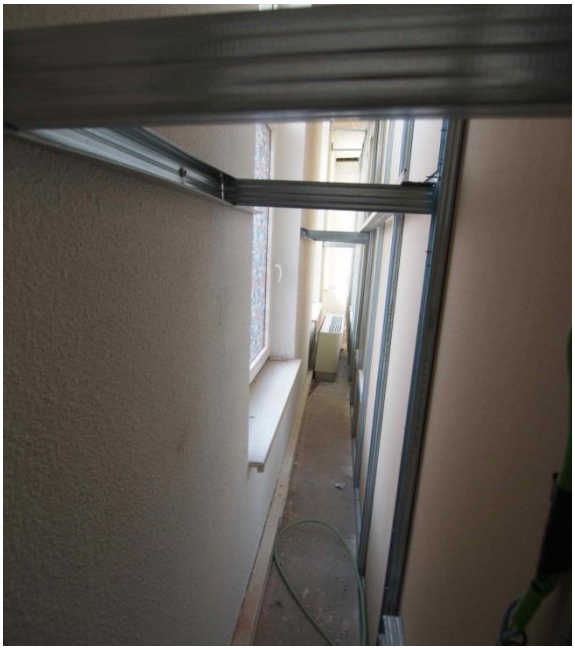
Many of the floors had parquet that was degraded and replaced when the use of the building changed, as well.

These were the initial materials, but later works of strengthening were made, plus other changes, as shown below. While the BCR branch operated there, changes were made: plaster drywall compartments at the walls and ceilings. The positions of the inner empty spaces were also changed, as toilets were added, etc. Double glazed windows were fitted to the inside, as well as AC convector units, for maintaining the desired temperature.



Ceiling made of drywall cardboard (left from BCR)

NOTE: In 2016, during the "ART SAFARI" exhibition, many plasterboard drywalls were mounter so as to make compartments for the artwork to be displayed, as well as for blocking light from entering along the façade. These walls have not been removed at the end of the exhibition and the building has not been restored to its original state.



Plasterboard drywall structure (left in front of the windows - '' Art Safari ', 2016)

6. INTERVENTIONS IN TIME

a. DAMAGE CAUSED BY EARTHQUAKES

The earthquake of November 10, 1940: no significant damage was reported, allegedly due to the height and shape of the building, as well as the quality of the bricks and mortar.

The earthquake of March 4, 1977: the building performed well. There appeared a few cracks, particularly in the transversal of high walls, in a few isolated walls, as well as in certain parapets. A few chimneys and finishing elements were damages, especially at the ceilings, but the stability of the building was not at risk.

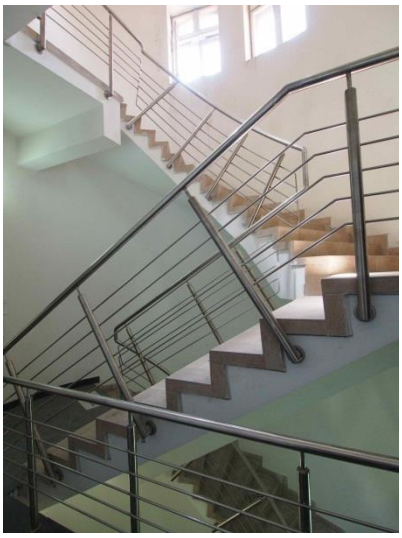
b. RESTORATION, FITTING UP AND STRENGTHENING INTERVENTIONS IN 1980-1983



Designer: IP CARPAŢI, arch. C. Rulea, Arch. O. Dimitriu, Eng. D. Lazar
Construction entrepreneur: TC CARPAŢI, T. Rangheţ, D. Broscăuţeanu

After the earthquake of 1977 and the decision to have its use changed, the Dacia Palace underwent complex works performed by the Carpaţi Construction Trust. These works can be grouped into the following categories:

I – strengthening; II - repairs and restorations; III – modifications of areas and new elements.


Concrete stairway made in 1980

Partial list of the works performed in the early '80s:

I. STRENGTHENING WORKS

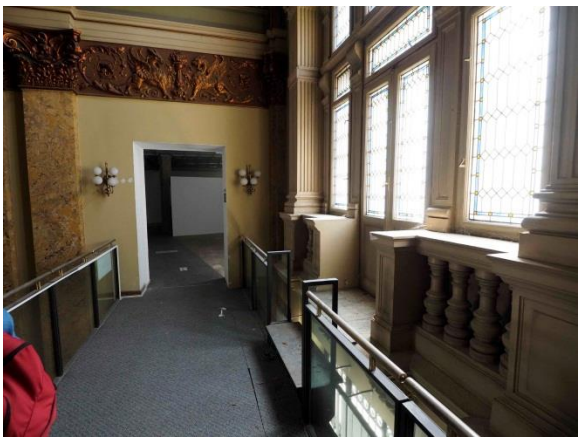
- the introduction of reinforced concrete floors;
- new stairways and elevators;
- reinforcing the basement walls.

II. REPAIRS AND RESTORATIONS

- the stairways were rebuilt;
- the rotten parquet was replaced;
- cracked walls were repaired;
- an uneven area of the ceiling was corrected, having reached level ± 0.00;
- restoration and repairs of decorative elements.

III. CHANGES MADE TO THE INNER SPACE, NEW CONSTRUCTIVE ELEMENTS

- one stairway was modified completely, changing its direction;
- new reinforced concrete stairways were made, as they were needed for the new use;
- the development of four large spaces, adjacent to the central hall, by the introduction of metal pillars instead of the removed load-bearing walls;
- two passage ways that horizontally connect the right and the left side of the 1st floor;
- the introduction of an people elevator and of a freight elevator, between the basement and the ground floor;
- the door empty spaces were moved.



Passage way - introduced in 1980

7. FINISHING ELEMENTS AND ADORNMENTS – STATE OF THE BUILDING IN SEPTEMBER 2017.

a. EXTERIOR FACADES

The building is in good condition, requiring small repairs, such as:

- repairing the cracks in the plasterwork;
- adding the missing plaster and incomplete decorations;
- repairing cracks in the split-tile base, and making a sealing connector at the Stavrolopoleos Street side;
- repairing the steps in the access areas;
- repainting the façade = new decorative plasterwork;
- completing the missing outside framework (woodwork, metalwork);
- treating and repainting the woodwork;
- completing the missing exterior window sills and tin frames.


One of the entries from Lipscani Street

ROOF COVER

- The roof cover was rehabilitated recently and is in good shape; the sheet is flat, electrostatically painted and has the same color as copper;

- drainpipes and gutters need checking;
- some chimneys rise above the roof cover and the way they are anchored needs checking.



The central dome and current cover

SKYLIGHTS

- require cleaning and sanitation;
- the waterproofing of the connecting elements needs checking;
- if necessary, repair will be made to damaged elements, including repainting.

TERRACES AND PATIOS

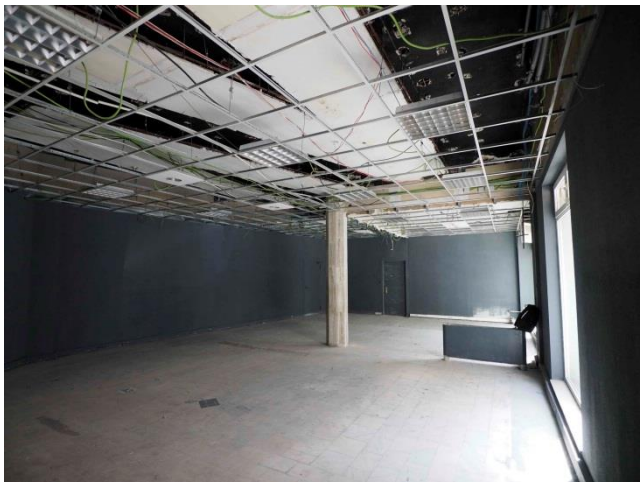
- the facades of the inner courtyards need the same repair works as those of the façades that face the streets; in addition, the degradation is worse here (fallen plasterwork, missing windows, areas of infiltration);
- the terraces that cover the courtyards (over the ground floor, 1st floor and 2nd floor, as appropriate) have areas that must to be cleaned of trash, weeds; tiles should be replaced and the waterproofing of these elements needs to be redone.



1st floor terrace, over the ground floor, CEC BANK

b. INTERIOR





Plasterboard drywalls and ceilings, the current situation

ON THE ENTIRE BUILDING:

- Any intervention should be made only after a documented historical study has been performed.

- It is necessary to remove drywall elements (compartments and hanging ceilings), the various useless materials that were abandoned there in recent years, after the venue was used improperly.
- all unusable materials must be removed and the interior must be cleaned carefully, so that the remaining decorations will be saved and the initial space will be restored.
After that, given that the building is class A monument, interventions can be made and the building can be set up in accordance with approved project.
- Interior finishes (the carpet, tiles, ...) will be removed and replaced, as needed.
- The position and route of the electrical, heating and plumbing installations will be adapted to the new use of the building.
- The entry from the Lipscani Street, which was closed and transformed into a window, will be restored.
- the doors and interior joinery need to be completed. Some of them need to be repaired.
- The interior plasterwork needs to be restored.
- The ceilings need to be restored, according to the new requirements and needs. A new light system needs to be designed and set in place.

THE BASEMENT

- It needs cleaning. It is necessary to find the places where water enters the building; there are many areas with infiltrations (possible sources need checking: the street façades - ventilation holes / windows; from the small courtyard of the skylight; faulty installations);
- it is necessary to check the status of the installations in the basement;
- it is necessary to repair the walls and ceilings;
- it is necessary to complete the doors, ventilation windows.





The basement

THE GROUND FLOOR

- The Lipscani street entrance, which was closed and transformed into a window, will have to be restored;
- access doors and entrance areas will have to be repaired;
- the richly decorated octagonal hall has been well preserved; it will require careful cleaning and restoring. If repairs need to be made, these works will be carried out by properly qualified personnel.



The skylight

THE 1st FLOOR

- The stairway in four ramps, which has been preserved from the original building, has traces of infiltration in the right wall, probably from the terrace over the ground floor (from the patio) in the area used by CEC Bank; some plaster decorations are compromised and they will have to be restored.



Leaks in the area of the stairway in four ramps

THE 2nd FLOOR

- The waterproofing of the skylights will be assured; they will be cleaned so as to have appropriate lighting.

THE ATTIC

- there are no finishes / floor boards, as people can only step directly on the brick of the vaults, some of which are detached; there are many wooden pillars supported by wooden girders; its height is generally low; thus, the attic is not trafficable / usable;
- the wooden structure is in good condition and the cover was restored; some structural elements are fractured along the length and must be replaced;
- a layer of insulation materials could be used; either in the floor boards or in the structure of the sheet cover;
- since it has not been used for a long time, a lot of dirt and rubble needs to be evacuated from here;
- the winch rooms - two elevator rooms that require cleaning / upgrading.


The attic

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7. Own archive photos, taken while making the sketch to scale, September 2017

8.

Bucureşti | Punct: Centrul istoric, str. Lipscani, sectorul dintre str. Eugeniu Carada şi str. Smârdan | Anul: 2007 (Bucharest | Point: The Historical Center, Lipscani St., the area between Eugeniu Carada and Smârdan Streets | Year: 2007), the "Vasile Pârvan" Institute of Archeology, Bucharest http://cronica.cimec.ro/detaliu.asp?k=3838

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References

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