Preliminary report on the COBPEE research project survey results

Survey regarding the public opinion on the level of seismic preparedness of the population of Bucharest

Community Based Performance Earthquake Engineering
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Summary

1. Introduction

The main contributor to the seismic hazard for southern and eastern part of Romania is the Vrancea intermediate-depth seismic source. This source has generated five seismic events with moment magnitude Mw ≥ 6.9 in: 1908, 1940, 1977 and 1990, the lase three being recent enough for a large part of the population to have felt them. The earthquake from March 4th 1977 earthquake (Mw = 7.4) produced the highest degree of material damage as well as loss of human lives in the XXth century.

The high level of vulnerability of the building stock in Bucharest is mainly associated with the buildings built in the years preceding the first official seismic codes (Fig. 1.1). These buildings are still inhabited today and have not been strengthened after the 1977 earthquake. According to the 2011 census, the Bucharest residential building stock comprises a number of 132,798 buildings of which only 2,505 have been structurally evaluated since 1992. Of these, 760 have been classified as into seismic risk classes. Out of the 760 buildings, 26.7% have been classified as Class I – public danger, 27.4% as Class I seismic risk and 46.9% as Class II. Out of these, 75 buildings have been strengthened.

Fig. 1.1: Representative buildings of Bucharest's vulnerable building stock

The research project entitled "Community Based Performance Earthquake Engineering" – (CoBPEE) aims to establishing a link between the level of expectations of people living in Bucharest regarding the safety of their buildings and the current seismic design codes.

According to NRC (2012), resilience is defined as the ability to *prepare, plan, recover and adapt to adverse events.* Bruneau et al. (2003) define *community resilience to earthquake* as the ability of social units (organizations, communities) *to mitigate risks, to control the effects of disasters when these occur, to carry out recovery activities with minimal social disruption and to minimize the effects of future earthquakes.* They identify the main features of a resilient system to be: low collapse probability, minimal consequences (casualties, economical and social losses, damage) and a short recovery period (after the event). Moreover, Bruneau et al. (2003) define resilience considering four dimensions: technical, organizational, social and economic. The technical dimension relates to structural systems; the organizational one refers to the institutional ability to manage emergency situations; the social dimension – to minimizing the adverse effects suffered by the society as a result of an earthquake; and the economic dimension relates to the ability to reduce economic loss resulting from earthquake.

The CoBPEE research project objective is to elaborate an improved framework for the design/structural evaluation of buildings by involving the community with a focus on the social component of resilience (Calotescu et. al, 2016; Pavel et. al, 2016). A key component of the

project is a large-scale survey conducted on the population of Bucharest. The survey is entitled: "*Survey regarding the public oppinion on the level of seismic preparedness of the population of Bucharest*" (Fig. 1.2).

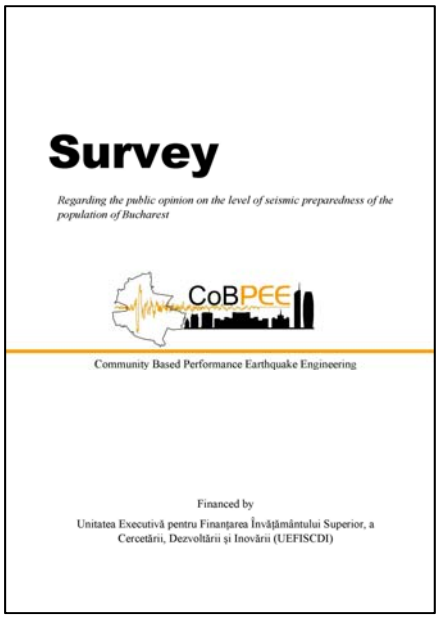

Fig. 1.2: Survey cover – paper version

Similar research focusing on population awareness and behavior in case of an earthquake has shown that important factors in determining seismic risk are not only social, economic, institutional and environmental, but also cultural and psychological. Education, earthquake recurrence or religion play an important role in people's behavior during an earthquake, behavior that can influence seismic risk.

A survey conducted by Armaș (2006), in which 220 people were interviewed in order to assess the behavior of the population of Bucharest during an earthquake, depending on demography, economic and educational background, shows that respondents associate earthquakes with death or building collapse. Although all the respondents had experienced an earthquake, only 10% of them live in the constant fear of experiencing another one.

Joffe et al. (2013) compared the attitude towards an earthquake of respondents from Seattle (USA), Osaka (Japan) and Izmir (Turkey). Their study attempted to find answers to three questions: (1) How do people in high seismic risk urban areas live? (2) How do they prepare for an earthquake? (3) Is there a link between how they prepare for a potential earthquake and their perception of seismic risk for their city? Following interviews and the analysis of results, the authors concluded that the respondents are aware of the seismic risk for their city. The Turks and the Japanese feel anxiety and panic, even pain in the case of Turks, always associating earthquakes with the ones they have personally experienced. The US respondents are aware of earthquakes but their feelings about them are more reserved. Respondents in Seattle and Osaka see their cities less vulnerable than other cities, whereas respondents in Izmir talk about cities less vulnerable as theirs by giving as an example cities in Japan. The American respondents are the most optimistic, aware of the risk, which they believe is unlikely to happen to them. When it comes to earthquake preparedness, all respondents answered that they must

be prepared with food supplies and turn off the gas after the earthquake. But no Turkish and only 7 US and 8 Japanese citizens talked about structural rehabilitation of their buildings.

After the series of earthquakes in Canterbury in 2010-2011, a number of studies on public perception about earthquakes were conducted. A series of earthquakes in New Zealand affected the Canterbury area (550,000 inhabitants) and the region (Potter et al., 2015). One of these studies (Mora et al., 2015) is based on a series of Twitter messages (254,000 posts) as well as on two study groups including office and sales workers, respectively. Within the Twitter messages, the most used words were *collapse, old, codes,* and *heritage*. The analysis shows that the residents were aware of the seismic risk in the area and were interested in discussing about the need for more effective design codes and about the building stock, which had inherited many old, unsafe buildings. The two discussion groups focused on safety and started with the question: "What is a safe building and what is an unsafe building?" The results show that the respondents were afraid of those unsafe buildings with which they don't have any connection (buildings other than their home or their office), and this fear results from the fact that they don't understand design codes or the principles based on which these are developed.

Studies on seismic risk perception and the quality of seismic design codes were also conducted in Iran and Pakistan, countries with seismic activity. In their study, Ainuddin et al. (2014) present Pakistani perceptions about earthquakes. The respondents are aware of the seismic risk, but not of the principles on which design codes rely. The authors recommended that the authorities carry out public information campaigns.

Earthquake-related public information and education campaigns in cities with high seismic risk have a great role in reducing the number of casualties in such an event. The Australian Geology Survey Organization (AGSO) conducted a risk assessment for different hazard assumptions, having the community as a main reference. Seismic zoning maps were developed, identifying micro zones of seismic risk and providing information about shelters or hospitals in the area. The maps were developed using Risk-GIS for the town of Cairns, where 86% of the buildings are built on soft sand sediments (Granger et al., 1999). A study by. Kates (1971) shows that individuals behave differently when in groups. The herd instinct and a lack of leadership can lead an individual who otherwise knows what to do in case of an earthquake to behave erratically and take incorrect group decisions. The study suggests that although individuals are informed when it comes to risks, when being part of a group they adjust their behavior (Kates, 1971). This reinforces the need to educate people and inform them properly when it comes to taking decisions in such situations, when instinct should have been formed through adequate education (King and MacGregor, 2000).

A survey conducted in California having 814 respondents shows that two out of three people believe that, in case of a large magnitude earthquake, new buildings will remain fully functional. Only a third of respondents are familiar with the term 'life safety' or the principles according to which buildings are designed/built. Most people would be willing to pay more than $35 additionally per square meter to own a more secure building. Four out of five respondents believe that a building's behavior in future earthquakes is of key importance (Davis and Porter, 2016). Design codes are developed with the aim of ensuring the highest degree possible of safety, as well as profitability, but an increasing number of studies show that

people living in seismic areas are increasingly interested in safer and more expensive buildings (Jaramillo et al., 2016; Calvi et al., 2014).

2. Statistic data analysis

Statistical research methods can be divided into two categories: descriptive statistics and inferential statistics, methods developed chronologically in this order. The first method involves collecting information, data or variables, and organizing, describing and presenting them through tables and graphic representations: columns or bars, histograms, pie charts or sections, frequency curves etc. The second method involves the interpretation of results, which are subsequently used to synthesize the investigation or decision-making.

Descriptive statistics, the classical statistics, is based on three distinct stages: observation (input), followed first by categorizing and processing the data collected and thereafter by the analysis and interpretation of results (output). Two more stages have been recently added (Săvoiu, 2012): inference (extrapolating conclusions from part to whole, from subgroup to community) and statistical decision making.

Statistical observation represents the collection and recording of primary data regarding certain features, variables of statistical units, according to a rigorously established observation plan. A variable measuring scale was introduced in 1946 by S. S. Stevens. This scale is widely accepted and used by the scientific community but challenged by statisticians (Velleman et al., 1993). Qualitative variables can be measured on both the nominal and the ordinal scales and quantitative variables – on the interval and ratio scales. Quantitative variables can be continuous or discrete. Methods of observation are the census, the statistical survey, the investigation or the opinion poll, the observation of the main unit and the monograph.

The observation method used in the COBPEE is the population survey through a questionnaire-based opinion survey, which represents one of the most common methods of investigation and data collection. The questionnaire is organized as a logical sequence of questions, which are closed, open, or a combination of the two. The questionnaire is addressed to a sample, a smaller group of people selected from a larger population. Usually ranging from hundreds to thousands of subjects, the sample of population can be selected through various methods (Singly et al., 1998): random sampling, quota sampling, stratified sampling, probability sampling. In order to be considered representative, quota samples must be similar in demographics and characteristics to the reference population. Probability sampling represents a statistical reference model.

The representativeness of a sample depends on several factors, including, according Rotariu and Iluţ (1996): the sample size, the degree of homogeneity or heterogeneity of the population studied, the sampling procedure.

The data collected using a questionnaire is processed through a computerized statistical process, which involves easy data entering and further processing with specific software programs.

Any variance in both qualitative (which has no numerical results) or quantitative (which has numerical results) data can be calculated through analysis of variance or ANOVA. This type of analysis indicates which proportion of a population variation is determined by fixed

factors that are systemic and which proportion is determined by random ones. As this type of analysis can be applied in several ways, according to the type of fixed or random effect obtained, the choice between one type of analysis or another may be difficult and should take into account its purpose. Factors triggering fixed effects include: types of treatment, tools, materials etc.; and factors triggering random effects include: days, people, animals etc. (Meloun and Militki, 2012).

Qualitative data

Lofland et al. (2006) have developed six different methods to analyze patterns in a specific research: the frequency; the magnitude or degrees of size; the structure or typologies; the type of organization; the causes; and the consequences. The analysis of qualitative data, which cannot be expressed numerically, can create in-depth, detailed knowledge of a phenomenon or process, with greater attention being able to be paid to human behavior, its social context and the relationship between them (Gârboan, 2007).

Cross-sectional analysis can be applied to either: (I) the variables, resulting in a partial conclusion of the whole phenomenon studied, or (II) to a single statistical unit, in this case resulting in a detailed conclusion over an individual or a part of the phenomenon (Babbie, 2008).

Qualitative data processing requires a constant back-and-forth between theory and analysis, following the discovery of patterns of change over time or of potential causal links between variables (Babbie, 2008). Responses are coded, for example, by selecting one/two/three codes for answers to open questions. Currently there are a number of programs used for processing qualitative data and the codes associated with them, among which Alceste, AnSWR, Atlas.ti, HyperResearch, Qualrus, SPAD, TAMS, T-LAB, Weft, using the functions *Find* or *Search* in Windows OS (Babbie, 2008).

Quantitative data

Quantitative data are data that can be expressed numerically or coded into numerical data. Data gathered through questionnaires can be coded directly in the questionnaire. This is followed by computerized data-entry, processing and analysis with the help of special programs, such as Excel, SPSS or MicroCal. Coding answers to a questionnaire allows expressing the language of those interviewed into numbers, based on horizontal distributions (Singly et al., 1998), organizing the information and facilitating the computer analysis of results. Univariate analysis refers to analysis of data variation caused by a single factor or a single variable (e.g. the number of male and female respondents).

Variations can be measured by two types of indicators, depending on the number of variants taken into account and their role:

- Simple indicators – for: standard deviation, variation amplitude;
- Synthetic indicators – for: linear deviation, variance, standard deviation and coefficient of variation.

A hypothesis or a phenomenon can be explained by analyzing its links with other phenomena. This can be achieved in a single table by crossing two variables, which can be selected to be: (I) both independent (II) both dependent and (III) one independent and one dependent. An independent variable may be an influencing factor for the study, while the other

variable may depend on the action of the former (i.e. cross-sectional analysis can be achieved in a table where there is an independent variable, the gender – women and men – and a dependent variable – the number the participants in a fund raising). Tables area read by, on one hand, conforming to the majority rule in relation to the dependent variable and, on the other hand, by applying the differential rule to the independent variable (Singly et al., 1998).

The relationship between two variables is verified by introducing one or more test variables. This type of causal analysis indicates social factors, independent variables contributing to a reality expressed by the dependent variables in a specific social indicated by the test variables (Singly et al., 1998). The number of cells in a representative table must not exceed the tenth of the number of subjects investigated (Singly et al., 1998). The questionnaire results can be initially analyzed by creating cross-analysis tables for the entire questionnaire, depending on age, gender and profession.

3. Results

The CoBPEE survey was conducted over a period of eight months (February to September 2016) on a total of 1,000 respondents. The target population was contacted, among other methods, by the online version of the questionnaire (http://cobpee.utcb.ro/) disseminated on social media and by email, as well as by distributing paper version of the questionnaire. The questionnaire contains both closed and, where necessary, open questions, with a preamble with additional explanation when necessary. The report presents the main results obtained from the statistical analysis of responses.

The questionnaire contains 34 questions and is divided into five parts, as follows:

- Part I (five questions) quantifies the level of public information and education regarding the occurrence of a potential major earthquake in Romania.
- Part II (six questions) quantifies the importance of the level of structural safety for the population and the its expectations regarding the safety of newly constructed buildings.
- Part III (six questions) quantifies the level of damage expected by the population after a Vrancea earthquake of great magnitude and the population's interest in having structural rehabilitation of the buildings they inhabit before the earthquake.
- Part IV (eight questions) identifies the people's attitude after a major earthquake, their expectations regarding the length of time acceptable to return to their previous housing and their opinion regarding the financial responsibility for repairing privately owned buildings damaged during the seismic event.
- Part V (eight questions) includes general information about the respondents (age, gender, education, income) as well as about the type of building in which they live.

The target population selected for study is the population of Bucharest, the selection criteria being age, geographic (sector-based), gender and demographic distribution (education). To validate the sample, the results were compared with statistical data from the Population and Housing Census conducted in 2011, the margin of error obtained being ± 3.1%.

In 2011, from among the total population of Bucharest of 1,883,425 residents 1,011,895 (or 53.7%) were women and 871,530 (or 46.3%) were men of the total.

As it can be seen in Fig. 3.1, Bucharest's respondents to the CoBPEE survey follow a gender structure (men and women) similar to that established in the 2011 Census.

In 2011, Bucharest's population distribution by age was: 16.4% children and adolescents, ages 0 to 19 years; 26.3% young people, ages 20 to 34 years; 22.2% adults, ages 35 to 49 years; 20.6% people aged between 50 and 64 years; and only 14.4% persons over 65 years.

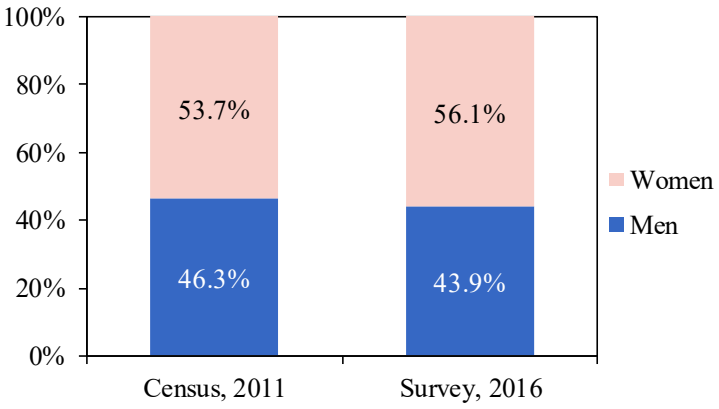

Fig. 3.1: Distribution by gender

The age structure of the CoBPEE survey respondents differs significantly from the Census of 2011, as noted in Fig. 3.2, particularly because the survey was addressed solely to adults aged over 18 years.

Here, the age group 0-19 years has minimal representation, achieved only through those aged 18 to 19 years. The lower age groups, 20-34 years and 35-49 years, participated significantly more in this survey, exceeding by approximately 10% their corresponding age groups in the 2011 Census. In the age groups 50-65 and over 65 years, participation is lower than in the Census by 0.5% and 7.9%, respectively. This may be attributed to lower accessibility by these age groups to the survey, as it was carried out mainly online.

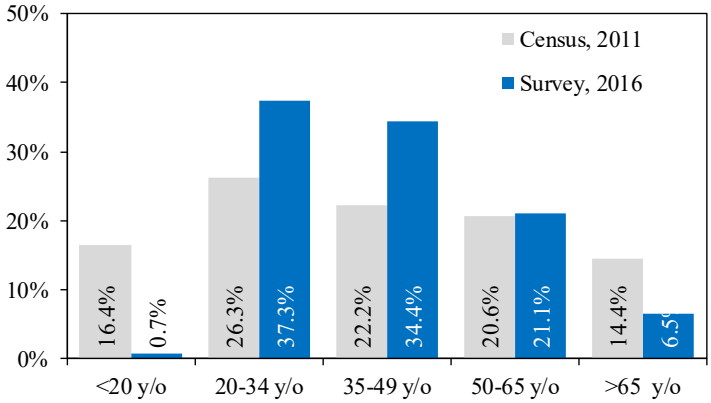

Fig. 3.2: Distribution by age

The comparative analysis of demographic distribution by districts (Fig. 3.3) between the 2011 Census and the CoBPEE survey shows that for three districts (3, 4 and 6) the percentage differences are of -1.7%, -0.7% and -2.4%, respectively, while for the remaining three sectors (1, 2 and 5) the differences are of + 4.4%, + 5.3% and -4.8%, respectively. An important aspect to note here is that city district 6, which contains mostly collective high dwelling buildings (blocks of flats) is adequately represented in the 2016 survey.

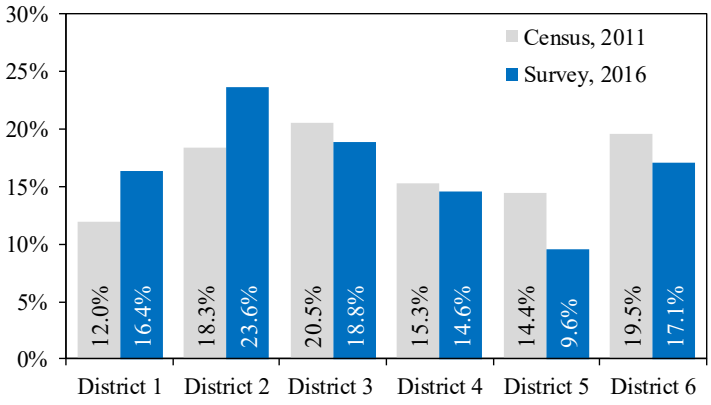

Fig. 3.3: Distribution by district

The two population surveys differ also regarding the type of residential buildings by 4.2%, as indicated in Fig. 3.4. Thus, the percentage of respondents residing in individual buildings increased at the time of the 2016 survey compared to that of the Census (2011) while and the percentage of respondents residing in collective buildings decreased between the two investigations.

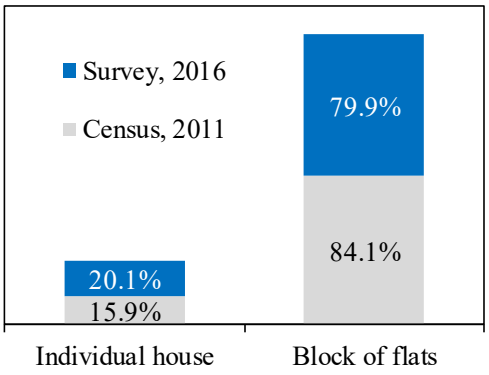

Fig. 3.4: Distribution by building type

Of Bucharest's total stable population of 1,883,425 residents, in 2011 the active population barely exceeded a rate of 50.95% or 959,532 people. Of the total inactive residents, pensioners had a share of 48.92%, school and college students reached only 26.75%, with the remaining 24.32% being stay-at-home residents, whether dependent or otherwise. The active population participated in higher numbers in the 2016 survey, exceeding by more than 50% their corresponding group in the Census (Fig. 3.5).

Likewise, a significant decrease in inactive population can be noted in the 2016 survey compared to the 2011 Census, as follows: unemployed (-4.9%), retired people (-17.5%) and pupils/students (-6.1%).

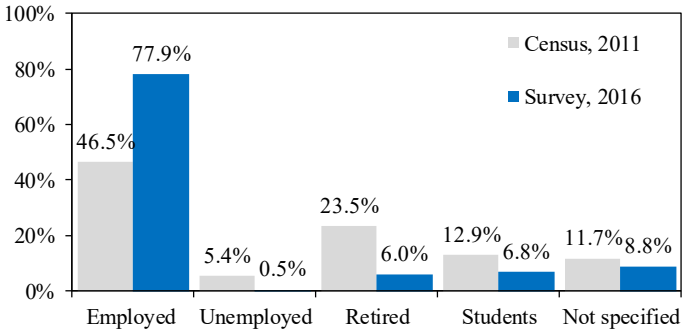

Fig. 3.5: Distribution according to profession

The structural rehabilitation of privately owned buildings constructed before the official seismic design codes came into force is currently highly debated. These buildings present increased vulnerability to major future earthquakes generated by the Vrancea source. There are countless cases where strengthening works had to be suspended or cancelled as a small percentage of owners refused to leave their homes for the duration of the works.

Among those who agree to have their buildings consolidated, the majority condition it on the state providing financial assistance, in the form of either a partial contribution (28.7%) or a full one (16.40%), or through the provision of an interest-free loan (9.9%). Only 2.9% of the respondents agreed to support the full costs of the consolidation works themselves, thereby assuming responsibility as owners.

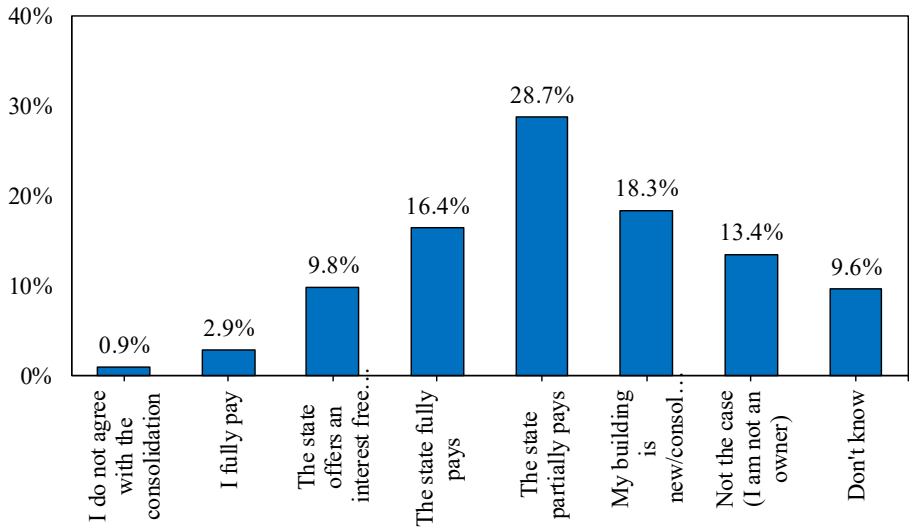

Fig. 3.6: Question 17: *I would strengthen my property (before the earthquake) if*

To question 18 of the survey: "*Should the building you inhabit be proposed for strengthening, would you agree to move temporarily to allow for consolidation works?*", 5% of the 985 respondents answered "No" (Fig. 3.7). The reasons given include the lack of financial capacity to rent alternative housing during the course of the consolidation works; mistrust in the quality of the works and in the deadlines for their completion; and faith in the fact that if their home was not damaged in the 1977 earthquake then the building is safe. Other reasons mentioned were: lack of time, the availability of additional housing (the owner does not live in the building that requires consolidation), and lack of personal comfort.

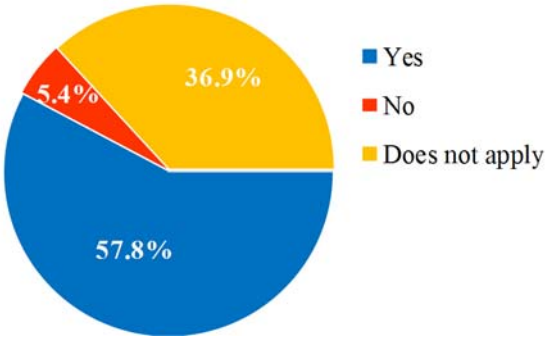

Fig. 3.7: Question 18 of the questionnaire: "*Should the building you inhabit be proposed for consolidation, would you agree to move temporarily to allow for consolidation works?*"

The statistical analysis of the CoBPEE poll results shows that 45.7% of the respondents have experienced at least one major earthquake generated by the Vrancea source (November

10th, 1940 and March 4th, 1977). Of these, 6.9% do not agree to temporary relocate should their home be proposed for consolidation (Fig. 3.8).

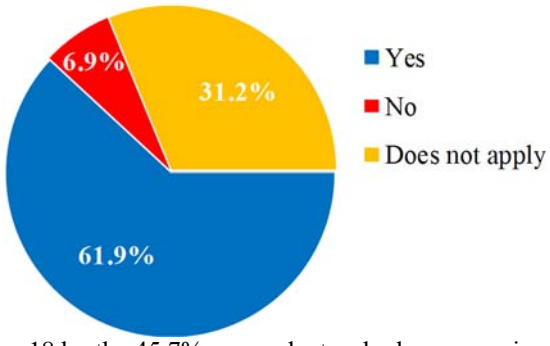

Fig. 3.8: Answers to Question 18 by the 45.7% respondents who have experienced at least one major earthquake*: "Should the building you inhabit be proposed for strengthening, would you agree to move temporarily to allow for the construction works*?"

A similar analysis shows that 26.9% of respondents live in apartment buildings built before 1977. Of these, 18.7% do not agree with a temporary relocation to allow for consolidation works, 6.9% of them living in buildings built before in 1940, 8.0% in buildings built between 1941 and 1964, and 3.8% in buildings built between 1964 and 1977 (Fig. 3.9). The largest percentage is constituted by those living in buildings built during 1941-1963, which are known to be among the most seismically vulnerable, being relatively tall buildings built at a time when earthquake engineering knowledge was limited. It is important to mention that the first mandatory seismic design provisions were issued in 1963.

The survey results tend to confirm the actual situation, namely that a small number of residents are able to prevent, for various reasons, the consolidation of vulnerable buildings in danger of suffering major damage or even collapse in the event of a major earthquake.

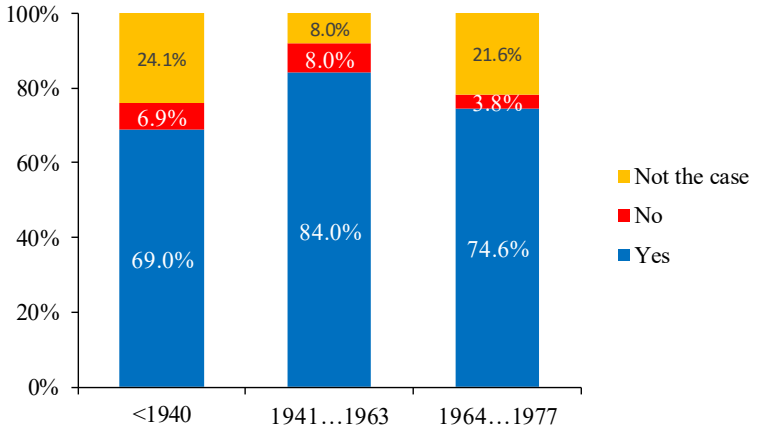

Fig. 3.9: Answers to Question 18 by the 26.9% respondents living in buildings built before 1977: "*Should the building where you live be proposed for strengthening, would you agree to move temporarily to allow for the construction works?*"

In terms of distribution by age groups (Fig. 3.2), 0.7% of the respondents are aged up to 20 years; 37.3% between 20 and 34 years; 34.4% between 35 and 49 years; 21.1% between 50 and 65 years; and 6.6% over 65 years. Table 1 highlights the valid responses (901) obtained for Question 18: "*Should the building you inhabit be proposed for strengthening, would you agree to move temporarily to allow for the construction works?*". Negative responses were received in the following percentages for each age group:

- < 20 years old: 16.7%
- 20—34 years old: 3.84%
- 35—49 years old: 3.23%
- 50—65 years old: 10.47%
- > 65 years old: 5.26%

Table 1 Crosstabulation – answers to Question 18 according to age

		18. *Should the building where you live be proposed for strengthening, would you agree to move temporarily to allow for the construction works?*"			
		Yes	No	Doesn't apply	Total
Age	<20	3	1	2	6
	20-34	182	13	143	338
	35-49	188	10	111	309
	50-65	120	20	51	191
	>65	31	3	23	57
Total		524	47	330	901

It can be concluded that the respondents aged 50-65 years are those who are the most reluctant to have consolidation works undertaken as well as to move temporarily to allow for these works. It is surprising that among those aged over 65 years, a smaller number of respondents disagree with the relocation, compared with the age group 50-65 years.

An analysis of the financial responsibility for damages to privately owned buildings following a major earthquake shows that the majority of respondents (51.7%) assigned this responsibility to the insurance company, as 63.9% of owners have mandatory insurance and an additional 37.5% have a second, optional insurance. A percentage of 35.8% of respondents believe that the state should contribute financially either by assuming full financial responsibility for damages or by granting of a preferential loan. Only 7.9% of respondents believe consolidation works should be financially supported by the owner.

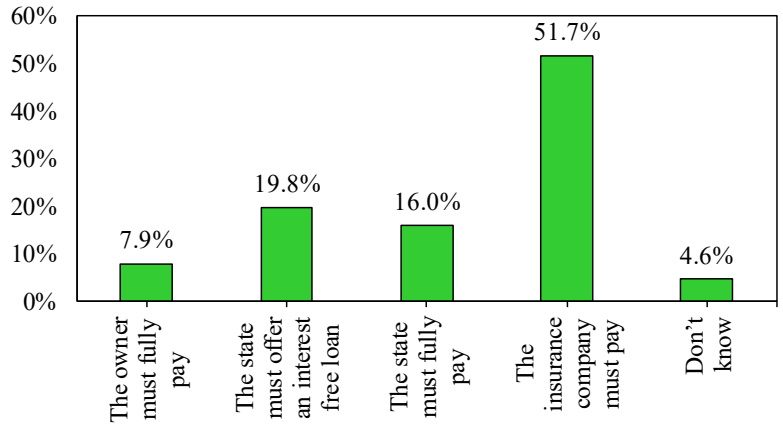

Fig. 3.10: Question 26: "*In your opinion, who should pay for the consolidation of the building you privately own following a major earthquake?*"

In terms of the population's attitude following a major earthquake, to question 24 "*After a major earthquake, you are forced to leave home. Which temporary shelter would you choose?*",

most respondents answered that they would opt for accommodation provided by relatives or friends and only 21.0% would choose a shelter provided by the authorities or NGOs (Fig. 3.11).

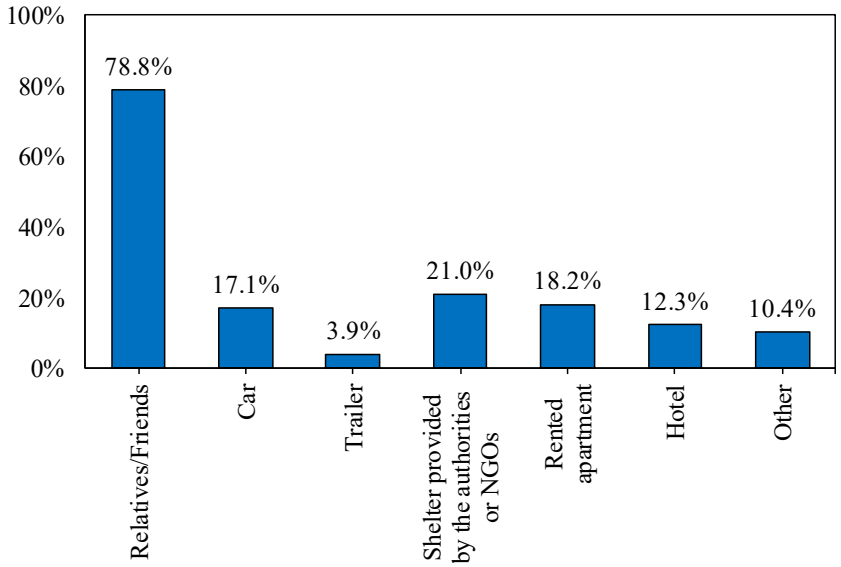

Fig. 3.11: Question 24. *After a major earthquake, you are forced to leave home. Which temporary shelter you choose?*

When asked if they would be willing to provide shelter for a short period of time to people affected by the earthquake, 89.6% answered affirmatively to accommodating people they know for a period of one day to several months while only 54.2% would agree to provide shelter to anyone, and most of these only for a few days (Fig. 3.12).

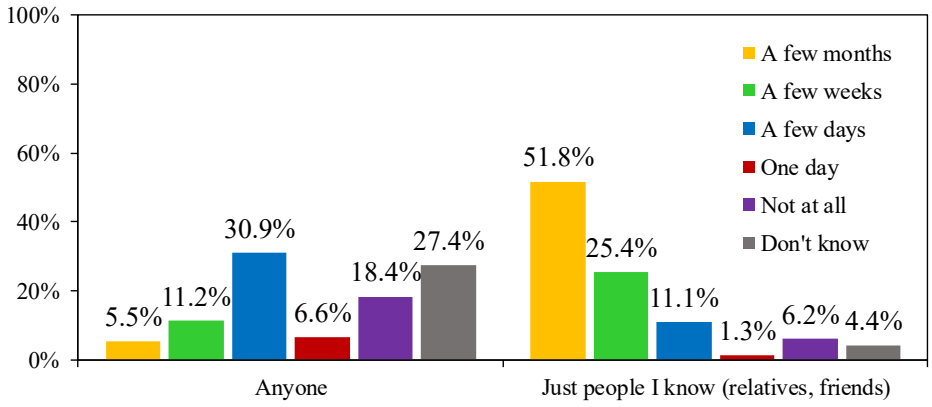

Fig. 3.12: Question 21. *After a major earthquake, would you be willing to provide shelter for a short period of time?*

In the event of a major earthquake, most people would find it acceptable to wait only one day for utilities such as water or telephone services to return to functionality, while for electricity and gas, a period of a few days is acceptable for almost half of the respondents (Fig. 3.13).

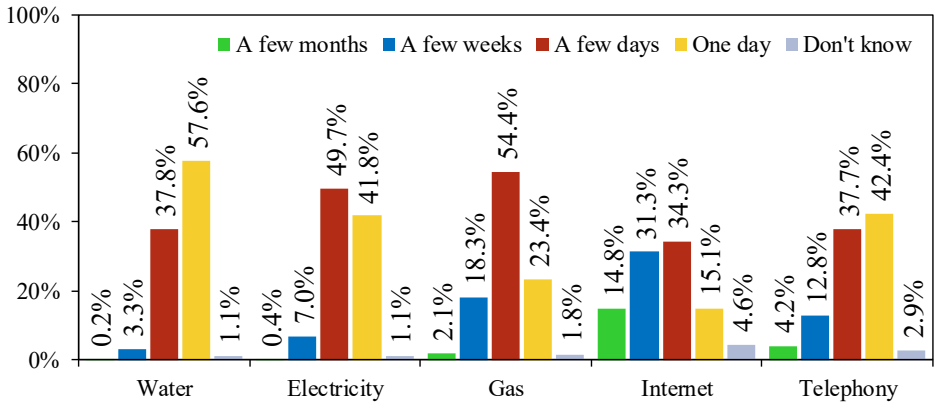

Fig. 3.13: Question 22. *After a major earthquake, how long do you find it acceptable for water, gas, internet or telephone provision/services to be restored?*

It is encouraging that a large part of the population would agree to provide humanitarian aid through various methods: from removing rubble to donating blood. Of all methods of assistance, offering financial aid obtained the lowest percentage (Fig. 3.13).

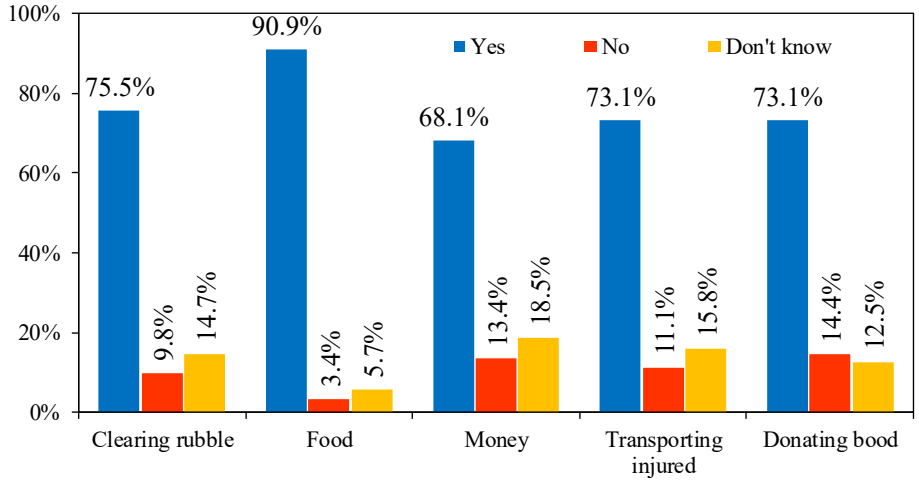

Fig. 3.14*:* Question 20. *After a major earthquake, would you offer humanitarian assistance by:*

4. Conclusions

The survey conducted within the research project Community Based Performance Earthquake Engineering (CoBPEE) is a first step towards achieving the main goal of the project, namely to create a better framework for the design/structural assessment of civil engineering by involving the population.

The survey targeted the population of Bucharest and was conducted over a period of eight months, reaching the intended sample size of 1,000 respondents. The questions were grouped in four parts quantifying, in part: the level of education and information of the population regarding a potential major earthquake in Romania; the importance of structural safety; the level of damages/losses expected by population after a major earthquake; and the level of public engagement following a major earthquake.

The results show that 63% of the respondents are aware of the possibility of a major seismic event in Romania. However; less than half (41.6%) are informed about structural prevention and the behavior they should adopt in case of an earthquake, as advised to the *Citizen's Guide to Emergencies* published by the General Inspectorate for Emergency

Situations (IGSU); only 4.9% have an “emergency backpack” or similar ready; and only 9.6% have set a family meeting point after the earthquake. This shows that Bucharest’s residents, although aware of the possibility of a major earthquake, do not seem prepared to face such an event.

Most respondents would feel safest in a building built in the period 1978-1992 (39.1%) compared to only 26.5% who would feel safest in one built more recently (2007-present), even though seismic design standards have improved significantly between the two periods. This shows on the one hand the lack of public information regarding the safety level currently adopted in the design codes and, on the other hand, the lack of trust in how these have been respected in the new construction projects.

The issue of structural rehabilitation for the existing vulnerable housing was addressed through two questions: if those living in such housing would be willing to leave home temporarily to allow for consolidation works; and to which extent they would be willing to participate financially, as owners, to structurally rehabilitate the building. Most respondents believe that the state should contribute financially through partial (28.7%) or full (16.4%) contributions, or by granting interest-free loans (9.9%). This shows first a lack of financial means and, second, a lack of accountability. Regarding those who refuse to leave their home, paradoxically, most of them are living in the most vulnerable types of buildings (apartment buildings built during 1941-1963). Their reasons given for this refusal were varied, most cited being the inability to pay rent or the absence of temporary housing alternatives.

As far as post-earthquake attitudes are concerned, the vast majority of Bucharest’s residents agree to provide humanitarian assistance in various ways, of note being however that providing financial aid is their last preference.

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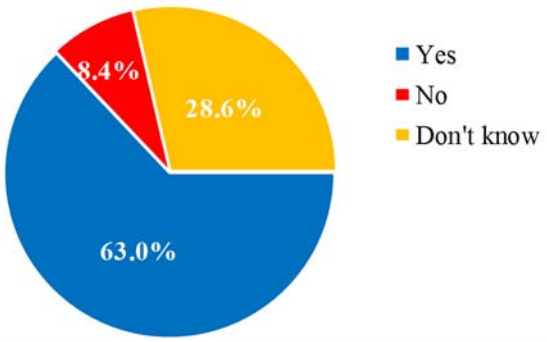
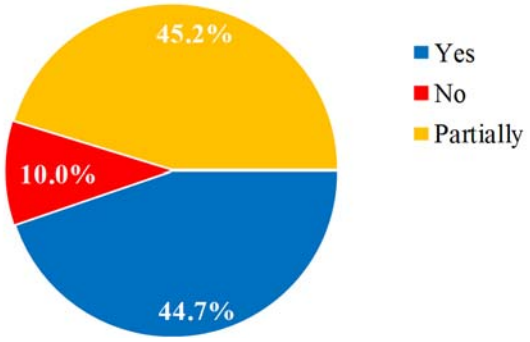
6. Annex

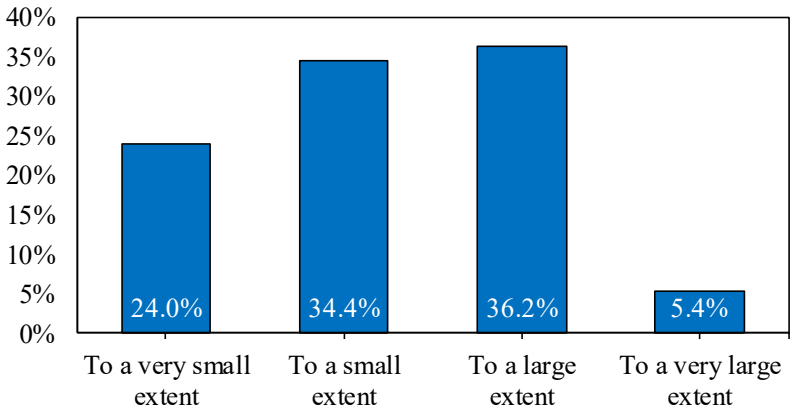
Do you believe there is the risk of a major earthquake occurring in Romania in the next period of time?



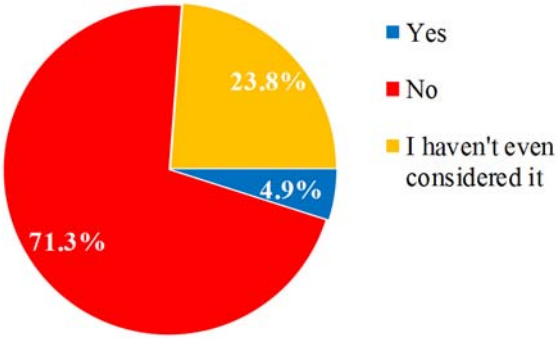
Do you feel safe in the building you inhabit?



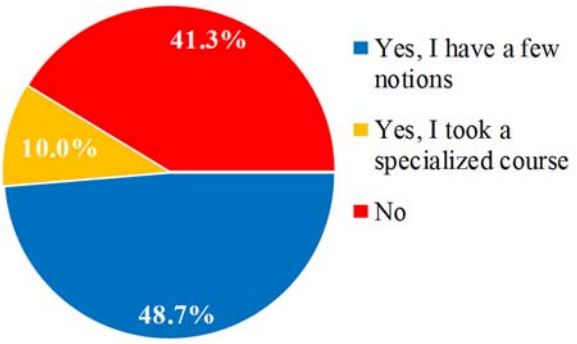
Do you know the prevention rules and the correct behavior during an Earthquake according to the IGSU *Emergency Situation Guide*?



Do you have an *Emergency Situation* bag or something similar?



Can you perform first aid?



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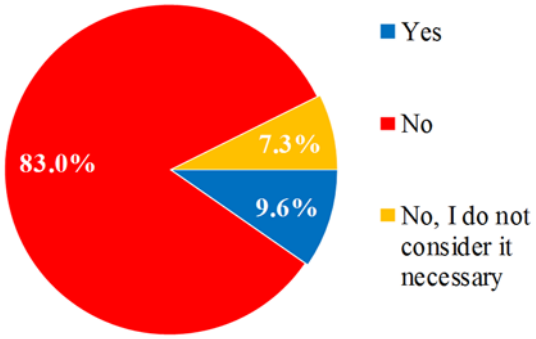
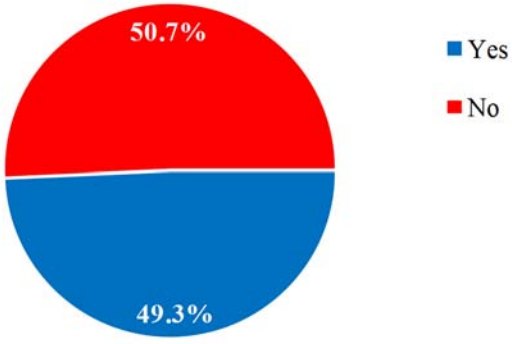
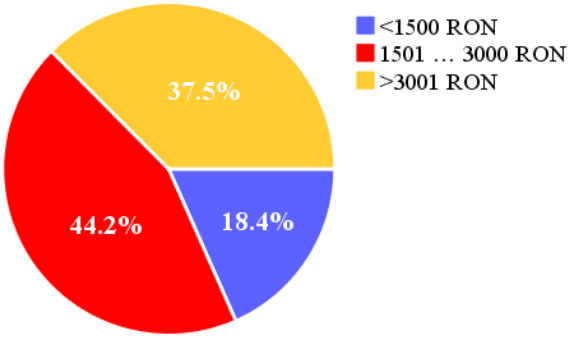
Do you have a specific place to meet with your family in case of a major earthquake?



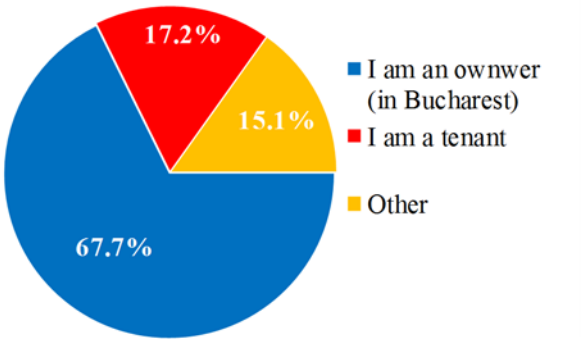
Do you have children?



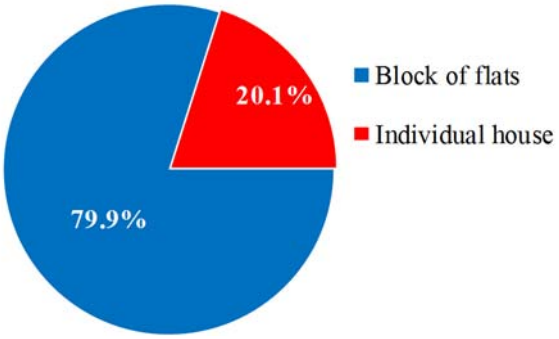
Your monthly income is:



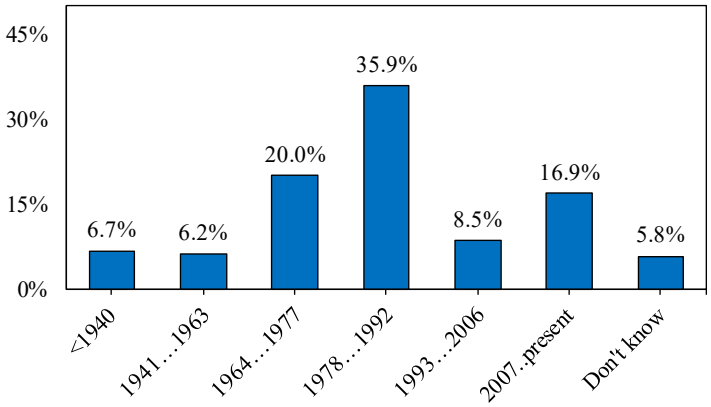
What is your housing situation?



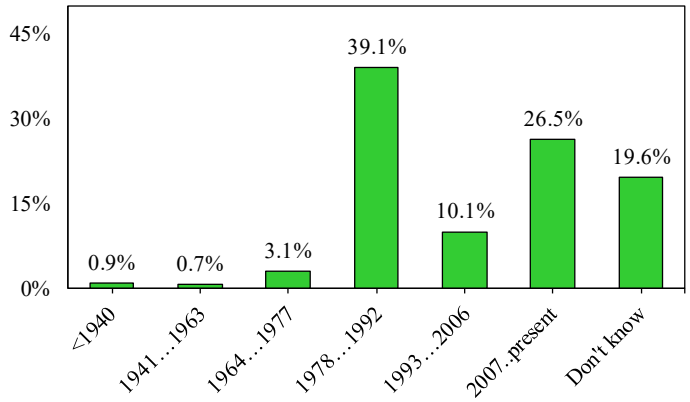
Describe the building you live in



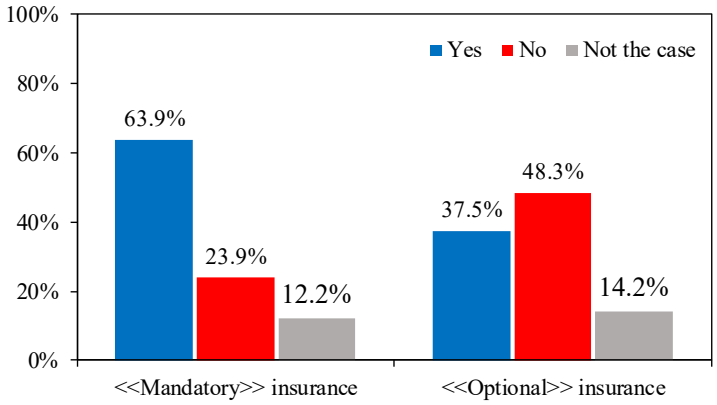
In witch time frame was the building you live in built?



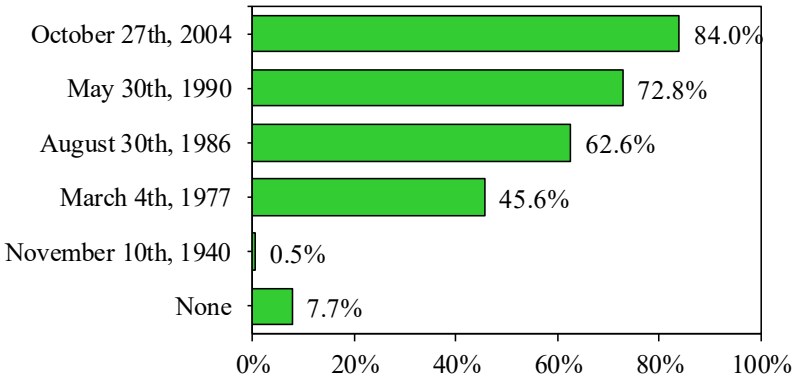
Do you feel safer in a building built in:



Do you have the mandatory insurance policy for your house?
Do you have an optional insurance policy for your house?



Witch of the following earthquakes did you feel?



How important is for you the earthquake safety level of the building you inhabit?