
ENSURING SEISMIC SAFETY OF PRIVATE RESIDENTIAL BUILDINGS IN THE FERGANA VALLEY

V. A. Kondratyev

Ph.D. Associate Professor

Samarkand State Institute of Architecture and Civil Engineering (Samarkand)

Abstract

In article the basic results of researches by an estimation and management of seismic risk of individual residential buildings from local building materials in territories of Fergana valley are resulted

Keywords: Local building materials, individual residential buildings; seismic risk, management of seismic risk.

Research and practical developments on this topic are carried out within the framework of the State Scientific and Technical Program A14-FA-F052 "Assessment of the technical condition of private residential buildings. .2011 g) ".

Within the framework of this program, studies are carried out for the Fergana, Namangan and Andijan regions [1].

The main goal of the project is to assess the degree of seismic damage to private residential buildings in the Fergana Valley;

According to the developed research methodology, there were the following tasks:

1. Collected and classified information about the historical seismicity and seismological conditions of the Fergana Valley;
2. Collected and classified information about occurred or discovered phenomena in the region of earthquakes. At the same time, special attention is paid to the analysis of the consequences of the earthquake of 20.07.2011;
3. According to the cadastral services, a list of classification objects related to various types of residential buildings and engineering systems is compiled. In general, and in their areas.

It has been established that in all territorial units, individual dwelling houses with the follow-

ing types of load-bearing structural systems prevail and stand out (Fig. 1 - 3): buildings with "synch" type frames; buildings with mud brick walls; buildings with baked brick walls; buildings with pakhsa walls; timber-panel (so-called "Finnish") houses.

4. Based on the results of a selective field survey of buildings of individual residential development, an assessment of their volume-planning and structural solutions from the standpoint of ensuring seismic resistance and compliance with the requirements of the current regulatory documents (CMC) was made.

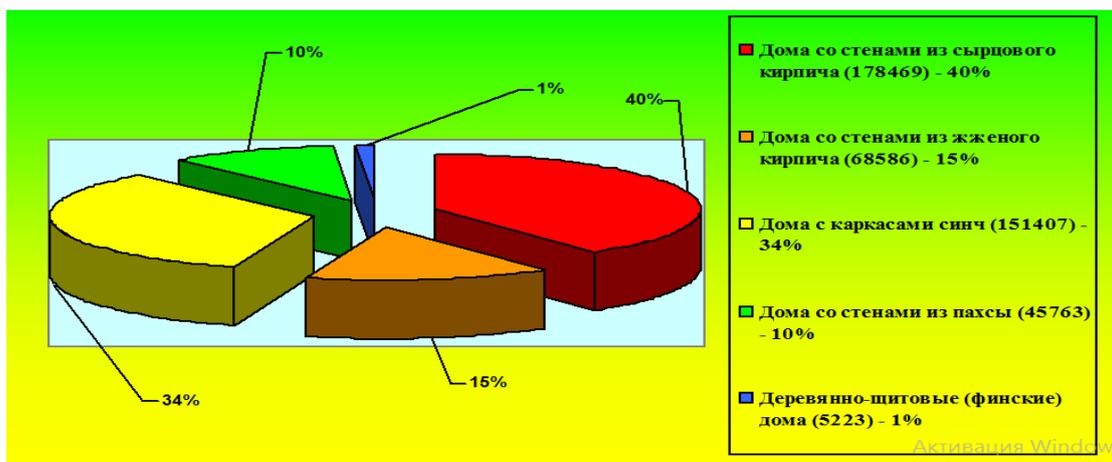


Fig. 1. The ratio of individual residential buildings with various types of load-bearing structural system in the total volume of individual housing stock in Fergana region (the total number of individual residential buildings - 449 448)

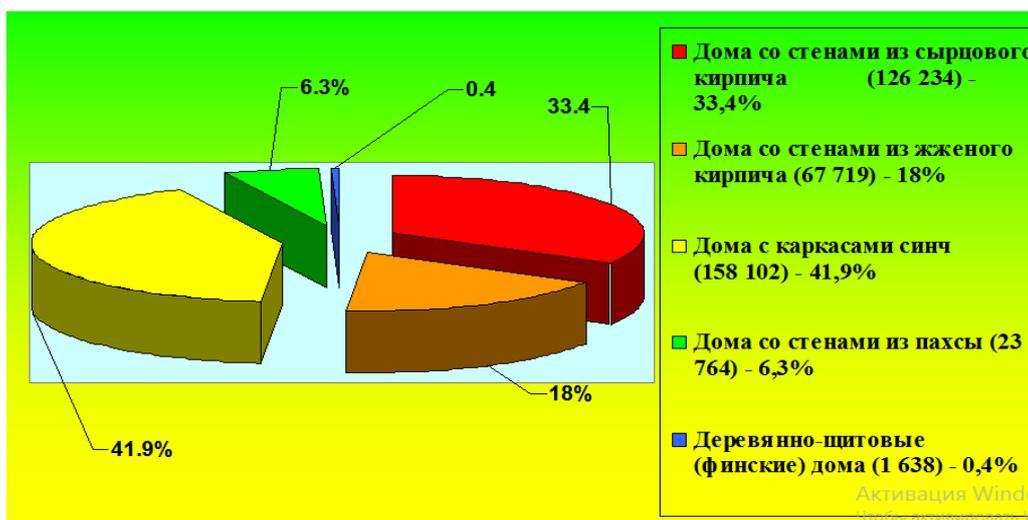


Fig. 2. The ratio of individual residential buildings with various types of load-bearing structural system in the total volume of individual housing stock in Naman-gan region (the total number of individual residential buildings is 377,457)

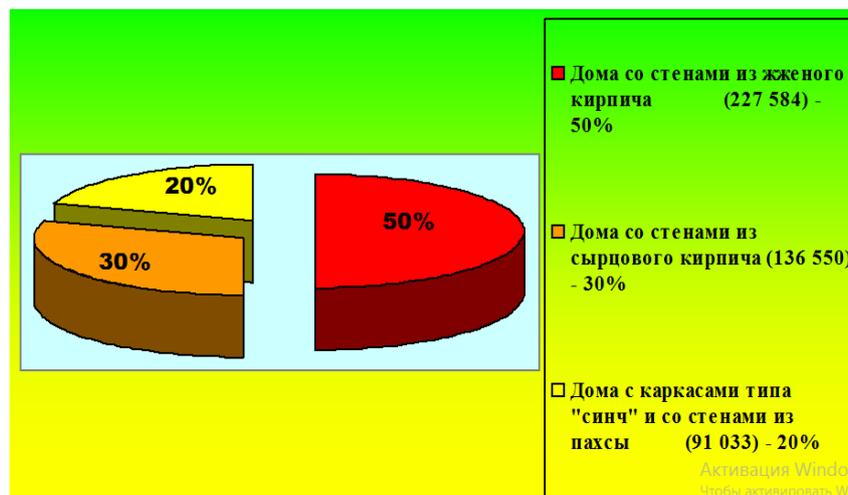


Fig. 3. The ratio of individual residential buildings with various types of load-bearing structural system in the total volume of individual housing stock of the Andijan region (the total number of individual residential buildings is 455 167)

At the same time, the most characteristic and frequently encountered facts of non-compliance with the requirements of KMK were highlighted in the volume-planning and structural solutions implemented by the construction.

In the Fergana region, 45 houses were surveyed in 31 settlements. In Namangan region, 172 houses were surveyed in 27 settlements. In Andijan region, 175 houses were surveyed in 24 settlements;

5. On the basis of the provisions of the RST Uz 836-97 "Scale for determining the intensity of an earthquake in the range of 6 to 10 points", differentiated criteria for assessing the degree of seismic damage to individual residential buildings (in particular, buildings with frames of the " sinch ", buildings made of pakhsa and buildings made of adobe bricks), as well as criteria for the expediency of strengthening, restoring or demolishing damaged and vulnerable buildings;

6. Predictive assessments of possible physical damage to individual housing stock in the study areas in the event of earthquakes with an intensity of 7, 8 and 9 points have been made. The above assessments were carried out both in the context of each of the districts, and in general for the Fergana, Namangan and Andijan regions.

In fig. 4 - 6 as examples, the results of assessing the level of seismic damage to individual

residential buildings of all types are given, in the case of earthquakes with an intensity of 8 points;

7. A series of calculations of buildings with "synch" frames was carried out in a spatial setting for seismic effects of 7, 8 and 9 points (12 variants of the problem were considered).

The provisions of the KMK on the need for anchoring to connect the lower strapping beams of synchronic frames with foundations have been calculated. It has also been proven that the widespread and characteristic for the region under study solution of the synchro frame with the use of an articulated-movable post-beam system in its upper part does not meet the requirements of seismic resistance and increases the degree of seismic vulnerability of buildings of this constructive solution.

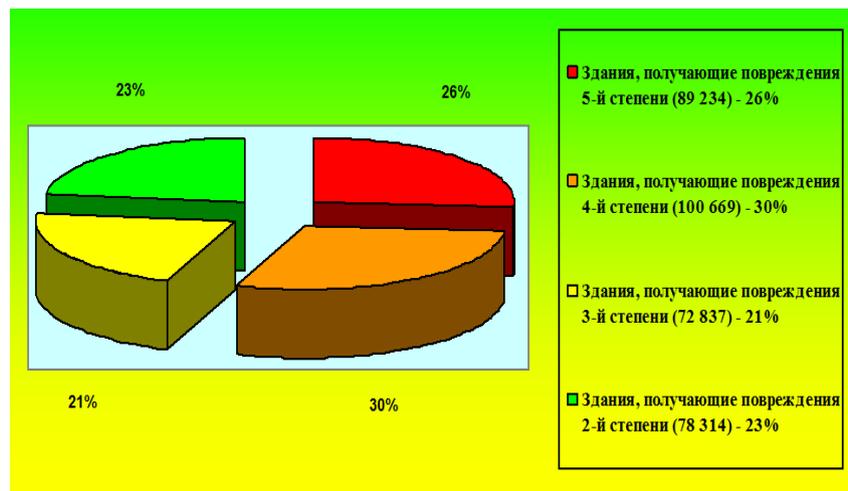


Fig. 4. The expected damage to individual buildings of all types in the Fergana region during an earthquake of 8 points (the number of damaged buildings - 341 054)

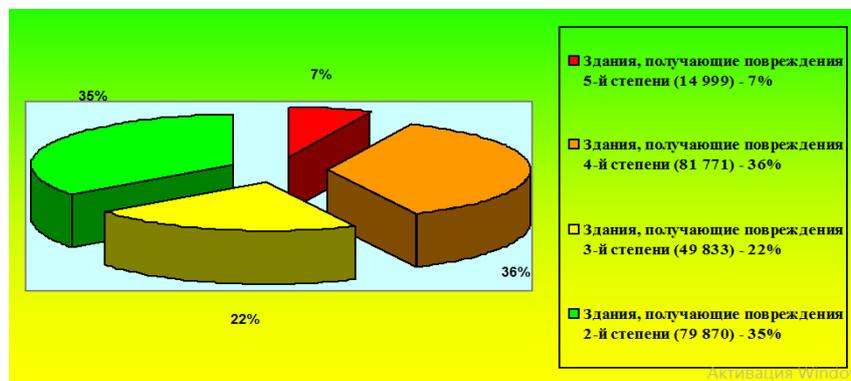


Fig. 5. The expected damage to individual buildings of all types in the Namangan region during an earthquake of 8 points (the number of damaged buildings - 226 473).

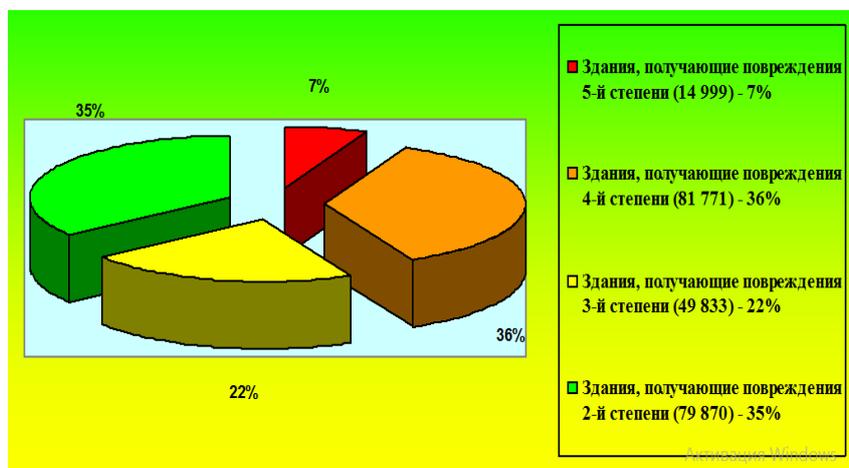


Fig. 6. Expected damage to individual residential buildings of all types in the Andijan region in the event of an earthquake with an intensity of 8 points (the total number of damaged buildings is 237 100)

8. A series of recommendations and manuals has been developed to ensure the seismic resistance of private residential buildings and increase the level of preparedness of the population for possible earthquakes (see Fig. 7), in particular: recommendations for ensuring seismic resistance and seismic strengthening of private residential buildings; recommendations for teaching the population to act in case of earthquakes; recommendations for reducing non-structural risk; manual for assessing the technical condition and safe operation of buildings;

9. In Fergana, Namangan and Andijan regions, regional scientific and practical training seminars were held with the participation of representatives of khokimiyats and territorial subdivisions of the Ministry of Emergency Situations, inspectorates of GASN, APU, local authorities, builders and specialized universities of the region, at which presentations of the main research results were made;

10. At the noted seminars, an assessment of the degree of preparedness of the population for earthquakes was carried out based on the results of a questionnaire survey of its participants.

The results of research in the Fergana, Namangan and Andijan regions, as well as the corresponding "Action Plans" were transferred to all management structures and are currently used in the development of various kinds of economic and social programs.

The results of the research carried out formed the basis of the monograph "Ensuring the

seismic safety of individual residential buildings in the Fergana Valley".

Research and practical development in this area is actively developing and continues at the present time.

References

1. Assessment of the technical condition of private residential buildings in the Fergana Valley and the development of recommendations for ensuring and increasing their seismic resistance (based on the consequences of the past and Fergana 2011 earthquakes). Research report for 2014 (final). - Tashkent: IMISS AS RUz. 2014 202 p.