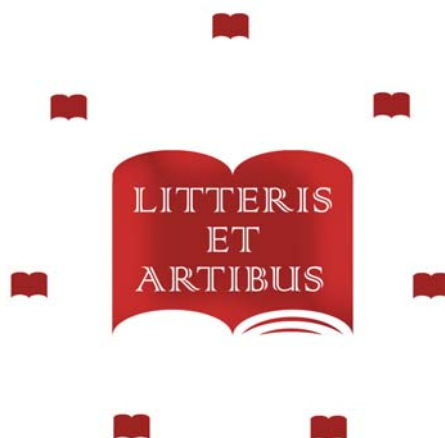


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YOUTH SCIENCE FESTIVAL  
“LITTERIS ET ARTIBUS”

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# A New Approach To The Dynamic Certification In Ukraine

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**Abstract – The paper devoted to the situation analysis of buildings dynamic certification in Ukraine, and to proposition to it's consideration as the part of the assessment system of actual seismic resistance**

Key words – dynamic certification, assessment system of actual seismic resistance

## I. Introduction

The project of Ukrainian seismic risk reduction state program provides among the priority tasks the certification of the existing Building Fund in the seismic regions of Ukraine: Autonomous Republic of Crimea, part of the Transcarpathian Ukraine, part of Odessa and Chernivtsi regions [2]

Paragraph 1.3 DBN B.1.1-12: 2006 "Construction in seismic regions of Ukraine" [2] regulates the carrying out of the buildings dynamic certification after completion of construction, and inspection and certification of existing objects in accordance with existing regulations on technical assessment and certification of industrial and civil buildings (structures), used in seismic areas

Also issues of buildings certification, of physical deterioration effects, have repeatedly been raised in a number of studies, both domestic and foreign authors (Y. Nemchinov, J. Eisenberg, M. Kliachko, Y. Berzhinskiy and other authors [0]). All this confirms the importance of the raised in this paper issue

## II. Dynamic Certification As A Part Of Building Technical State Passport

Certification of buildings (structures) is the first step to the preservation of existing buildings, particularly it is important for the conservation of architectural monuments and structures constructed long time ago.

Notwithstanding the requirements of regulatory documents frequently there is no information about the object, such as a square, size, date of overhauls, data on changes in layouts (if any), the bearing structures material data, also information about foundations and roofs is absend. Frequently information on geology, groundwater and underground mines missed.

Majority of the industrial, civil and hydrotechnical objects, have no executive documentation that disappeared as a result of wars, reconstructions and various natural disasters. And all of this structures requires for sertification.

The main task of buildings and structures certification is the compilation of a document called Building's Technical Condition Passport. The compilation of building's technical condition passport is preceded by the big amount of the assessment works:

- anthropogenic environmental change;
- geological site conditions; the chemical composition of the groundwater; the structure and landscaping elements; bases and foundations etc.
- the design and construction to buildings protect from dangerous geological processes;
- the structure and landscaping elements;
- bases and foundations;
- entries and outlets of utilities;
- underground, waterproofing and protecting constructions;
- condition ambient air in and around the building (temperature, humidity, ventilation, chemical composition of the air);
- overground bearing and enclosing structures;
- covers and roofs;
- anticorrosive protection of structures, floor internal and external equipment;
- heat engineering, plumbing and ventilation systems and equipment;
- insulating coating;
- other elements of buildings and their systems, design and installation of which is regulated by building codes

The result of the certification is the creation of unified system of registration ' monitoring and control of the objects state for well-timed detection of pre-emergency and emergency situations, as well as the stop the exploitation of emergency dangerous buildings (structures).

Certification of buildings - the primary stage of works to secure the necessary and economically viable level of earthquake resistance buildings in terms of moral, physical deterioration of structures, refine seismic hazard and further improve the current codes for design and construction in seismic regions of Ukraine [3].

The essence of the dynamic certification is to determine the buildings actual seismic resistance and compare it with the value of the potential seismic action at the site

## III. Dynamic Certification, As A Part Of The Actual Seismic Resistance Of Buildings Assessment System

Overall dynamic certification of buildings and structures is very expensive and may be recommended as the first step only for newly erected buildings and for existing buildings, which are under the reconstruction, or for especially important and unique objects. And also for objects that need additional inspection for the first level of the actual seismic resistance assessment.

The earlier proposed system of the actual seismic resistance assessment suggests, to determine three levels of assessment depending on the degree of responsibility of the object (consequence class) and the objectives of the inspection (assessment of potential damage as a result of the earthquake, assessment or monitoring of the technical condition of the building):

**- Assess of actual seismic resistance level 1 (AASR-1)**

- to assess the seismic risk of regions and develop action plan to improve the earthquake resistance to ensure the required level of reliability, also the development of a set of measures to eliminate the effects of earthquakes in the world practice technique as a form compiled on the basis of visual inspection.

**- Assess of actual seismic resistance level 2 (AASR-2)**

- A formal approach to the assessment of seismic resistance in the form of certification for building objects. This level includes dynamic certification, with elements of vibrodiagnostics and Final Element method modeling of structures behavior.

**- Assess of actual seismic resistance level 3 (AASR-3)**

- for the experimental buildings, especially important and unique objects (Consequence class CC3), it is necessary not only to carry out engineering and seismic tests, but also to design and test building using numerical simulation of nonlinear building structures under seismic impact that describes it via accelerograms recorded on the construction site .

In such system the dynamic certification in the first level can be recommended only for the especially important and unique objects. A system AASR1 may be the first obligate step in the creation of a buildings dynamic certificate.

## Conclusions

1. Thus, for today there is no a single legalized method of dynamic certification in Ukraine at the level of Building code or standard.

2. Dynamic certification must be considered not only as a separate complex of works, but as part of a three-level assess of actual seismic resistance system.

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