



PROBLEMS OF EARTHQUAKE RESISTANCE IN CULTURAL HERITAGE MONUMENTS PROTECTION AND CIVIL ENGINEERING

II INTERNATIONAL CONFERENCE "SEISMIC – 2018"

Tbilisi, Georgia, 30.06.2018-1.07.2018



Organizers:

- European Council of Civil Engineers (ECCE)
- Georgian Society of Civil Engineers (GSCE)
- World Council of Civil Engineers (WCCE)
- Georgian National Academy of Sciences
- Tbilisi City Hall
- San Diego State University Georgia
- Progress in Education and Science

Scientific Committee

- **Iuri Svanidze M.ASCE** – ECCE ExBo Member Official Representative in the Commonwealth of Independent States; President of Georgian Society of Civil Engineers (GSCE)
- **Aris Chatzidakis** - Vice-President/Elected President of European Council of Civil Engineers (ECCE)
- **Alfonso Gonzalez Fernandez** - President of World Council of Civil Engineers (WCCE)
- **Yaroslav Slobodyan** - Vice President, Member of the European Council of Civil Engineers, Doctor of Technical Sciences
- **Michael Lachinov** - Russian society of Civil Engineers (RSCE) RSCE Deputy President Chairman
- **José Francisco Sáez** - Rubio Executive Director of World Council of Civil Engineers (WCCE)
- **Halil M Guven** - Dean of San Diego State University - Georgia
- **Kenneth D. Walsh** - Senior Assistant Dean and Chief of Staff University of California, Irvine Henry Samueli School of Engineering
- **Guram Gabrichidze** - Georgian National Academy of Sciences
- **Archil Prangishvili** - Rector of Georgian Technical University
- **David Gurgenidze** - Dean of Faculty of Civil Engineering of Georgian Technical University
- **Lia Kakhiani** - Georgian Technical University
- **Malkhaz Bediashvili** - Engineering Academy of Georgia
- **Johny Gigineishvili** - "Progresi" Ltd. Engineering Center
- **Jarosław Rajczyk** - Czestochowa University of Technology
- **Nino Tsereteli** - Javakhishvili Tbilisi State University, Institute of Geophysics
- **Paata Rekvava** - President of Association of Seismic resistance
- **Davit Pataraia** - G. Tsulukidze Mining Institute
- **Yuriy Geraymovich** – *LIRA SOFT Ltd, Kiev, Ukraine*

Organizational Committee

- **Lenka Lausova** - Technical University of Ostrava
- **Gela Kipiani** - President of NGO "Progress in Education and Science"
- **Nino Kordzakhia** – Conservation Architect, ICOMOS Georgia
- **Otar Tsitsilashvili** - A(A)IP "Tbilisi Municipal Laboratory"
- **Iuri Svanidze M.ASCE** – ECCE ExBo Member Official Representative in the Commonwealth of Independent States; President of Georgian Society of Civil Engineers (GSCE)
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- **Tinatin Magradze** - Georgian Technical University
- **Nodar Grigolia** - Georgian Society of Civil Engineers
- **Lali Qajaia** - Institute of Geophysics
- **Nino Kordzakhia** – Conservation Architect, ICOMOS Georgia
- **Salome Kilanava** - San Diego State University – SDASU Georgia

II International Conference Seismic – 2018

Problems of Earthquake Resistance in Cultural Heritage Monuments Protection and Civil Engineering

Program Structure

Georgian National Academy of Sciences, Rustaveli st. 52 III floor	30. June 2018 Conference Hall III floor
9.00-10.00	Registration of participants
10.00-10.20	Opening of conference by Iuri Svanidze M.ASCE – ECCE ExBo Member Official Representative in the Commonwealth of Independent States; President of Georgian Society of Civil Engineers (GSCE)
10.20-10.40	Aris Chatzidakis - Vice-President/Elected President of European Council of Civil Engineers (ECCE)
10.40-11.00	Greeting of President of World Council of Civil Engineers (WCCE) Mr. Alfonso Gonzalez Fernandez
11.00-11.20	Greeting of Dean of San Diego State University - Georgia Halil M Guven
11.20-11.40	Nino Kordzakhia – Conservation Architect, ICOMOS Georgia
13.00-14.00	Lunch
Georgian National Academy of Sciences, Rustaveli st. 52 III floor	Session 1. Problems of Earthquake Resistance in Cultural Heritage Monuments Protection and Civil Engineering (Plenar reports) Co-Chairman: Guram Gabrichidze, Gela Kipiani

14.00-14.30	Nino Tsereteli¹, Massimiliano Moscatelli², Zurab Gogoladze¹, Silvia Gialiini² Maurizio Simionato², Iolanda Gaudiosi², Otar VarazanaSvili¹, Pietro Sirianni², Federica Poloetta², Francesco Stigmano², Marco Mancini² 1. Javakhishvili Tbilisi State University, Institute of Geophysics 2. Institute of Environmental Geology and Geo-engineering of the National Research Council of Italy (CNR)
14.30-15.00	Yuriy Geraymovich, Isaak Yevzerov, DmitriyMarchenko - Calculation of seismic impacts in software package LIRA 10.8 - Ukraine
15.00-15.30	Guram Gabrichidze - The mankind looks for new ways of protection against earthquakes. New Paradigm of seismic Protection - Georgia
15.30-16.00	Lasha Samkharadze, Iuri Svanidze, Temur Shubitidze, Otar Tsitsilashvili - For the issue of accident rate on extensions performed on multi-storey capital residential buildings - Georgia
16.00-16.30	Malkhaz Bediashvili, Gela Kipiani - Methods to reduce the losses at catastrophic earthquake - Georgia
16.30-17.00	Johni Gigineishvili, Igor Timchenko - Modern problems and prospects of basalt-plastic rebars application for reinforcement of concrete - Georgia
17.00-17.30	David Pataria - Modeling and analysis of statics and dynamics of building structures using calculation method and special algorithm based on discrete expression of solid deforming body - Georgia
19.00	Banquette
	1. July 2018
Georgian National Academy of Sciences, Rustaveli st. 52 III floor	Session 2. Problems of Earthquake Resistance in Cultural Heritage Monuments Protection and Civil Engineering Co-Chairman: Malkhaz Bediashvili, Johni Gigineishvili

10.00-10.15	Yuriy Geraymovich, Isaak Yevzerov, Dmitriy Marchenko - The new physically nonlinear finite elements in software package LIRA10.8 - Ukraine
10.15-11.30	Johni Gigineishvili - Theoretical and experimental studies of concrete structures reinforced with basalt-plastic reinforcement for earthquake-proof construction - Georgia
11.30-11.45	Manuchar Shishinashvili, Aleks Burduladze, Manana Magradze - Provision of motorway land valve stability in the seismically active zones - Georgia
11.45-12.00	Lia Balanchivadze, L. Nardaia - Per-tense structures and features of designing buildings for seismically active regions - Georgia
12.00-12.15	Paata Rekvava, Ketevan Mdivani, Lali Qajaia - Architects and structural engineers' role in buildings seismic resistant design - Georgia
12.30-12.45	Igor Timchenko, Johni Gigineishvili - Site-specific soil dynamic effects - case study of the high rise building design - Georgia
13.00-14.00	Lunch
14.00-14.15	M. Kalabegashvili, G. Kipiani, D. Tabatadze, D. Jankarashvili, A. Tabatadze - On framework building columns seismic impact effect - Georgia
14.15-14.30	Edisher Machaidze - Study of mode of deformation of layered cylindrical shell - Georgia
14.30-14.45	Gela Kipiani, Natruli Kharchavanidze, Bela Tsikaradze - Research of Stability of having irregularities thin layer spatial structures - Georgia
14.24-15.00	Marlena Rajczyk, Damian Jończyk, Bartłomiej Stachecki - The impact of seismic interactions on skeletal wooden buildings reinforced with FRP elements - Poland
15.00-15.15	Jarosław Rajczyk - Influence of surface roughness parameters on dynamic loads of the bridge structure, especially in seismic areas - Poland
15.15-15.30	RAJCZYK Paweł¹, Bednarczyk Karolina - machining tools for the expansion of the advanced technical level of society – Poland
15.30-15.45	RAJCZYK Paweł, Rajczyk Marlena - Elastomer constructions reducing dynamic loads - Poland

15.45-16.00	Tamaz Gardapkhadze - Analysis of stability of corrugated variable thickness spatial shells - Georgia
16.00-16.15	Marina Gardapkhadze - Analysis of multilayer variable thickness shell of revolution in non-linear theory - Georgia
16.15-16.30	Zviad Churchelauri - Study of the mode of deformation of elastoplastic spatial shells of rotation - Georgia
16.30-16.45	Badri Churchelauri, Aleksandre Tkeshelashvili - Modeling of the reinforced concrete axisymmetric Plates fracture at action of static loads - Georgia
16.45-17.00	David Kipiani, Lia Kipiani, Fatima Verulashvili, Zurab Rusia - Research of mode of deformation of thin-walled structures with stiffness ribs - Georgia
17.00-17.15	Gela Kipiani, Revaz Kakhidze, Giorgi Okropiridze, Fatima Verulashvili - Analysis of multi-span hinged-cantilever and beams with cuts building application of generalized functions - Georgia
17.15-17.30	Nikoloz Kachkachishvili - Dynamical analysis for multilayer spatial systems by finite elements method - Georgia
17.30-17.45	Gela Kipiani, Marlena Rajczyk, Lenka Lausova - Practical method for analysis of orthogonal plates with consideration of specific model of design diagram, boundary conditions and loading - Georgia
17.45-18.00	Malkhaz Bediashvili, Vazha Sulashvili, Gela Kipiani - Method of transversal waves damping - Georgia



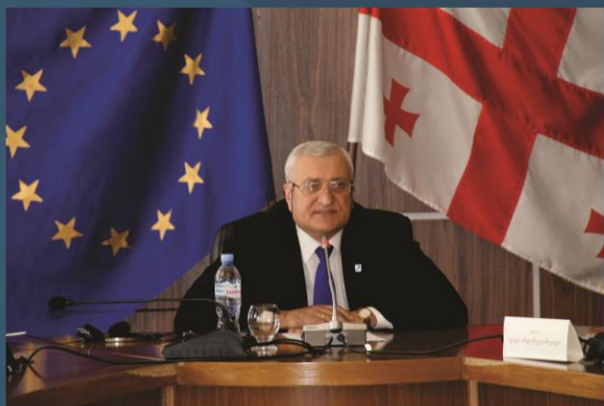
Aris Chatzidakis - Vice-President/Elected President of European Council of Civil Engineers (ECCE)



Iuri Svanidze M.ASCE – ECCE ExBo Member Official Representative in the Commonwealth of Independent States; President of Georgian Society of Civil Engineers (GSCE)



Halil M Guven - Dean of San Diego State University



FOR THE ISSUE OF ACCIDENT RATE ON EXTENSIONS PERFORMED ON MULTI-STOREY CAPITAL RESIDENTIAL BUILDINGS

I. Svanidze, L. Samkharadze, T. Shubitidze, O. Tsitsilashvili
(A(A)IP "Tbilisi Municipal Laboratory")

During the last few years, A(A)IP Tbilisi Municipal Laboratory has performed visual examination of hundreds of damaged buildings in Tbilisi and proper analysis of the restoration-reinforcement project documentation. In the report is stated the situation revealed in the process of these works, for a specific group of accidental residential buildings - for extensions (for the buildings with main and extension parts) and are proposed the direction for elimination of this group building's accident rate in terms of statement of question.

In particular if there is not necessity for demolition of accident rate extension, the quite effective direction of solution-measures forelimination of the accident rate of extensions would mean the arrangement of seismic insulation installations between the main building and extension. Obviously, in this case, the efficiency of the accident rate elimination measures is crucial to the relationship between new and older systems that provide their reliable joint work for any direction of new design seismic loads. The creation of such joint spatial systems from new and old load bearing structural systems, in each specific case, should be preceded by comparative analysis of the various variants developed with the application of spatial and non-linear calculation of appropriate accuracy.



THE MANKIND LOOKS FOR NEW WAYS OF PROTECTION AGAINST EARTHQUAKES. NEW PARADIGM OF SEISMIC PROTECTION

Guram Gabrichidze

Member of Georgian National Academy of Sciences

Key words: seismic safety, risk theory, earthquake engineering, forecasting of earthquakes.

Mankind acknowledges that seismic safety of a large amount of the Earth, towns situated through it and other assists is not adequately maintained by antiseismic construction concept and proper legal Building Codes. Additional efforts should be taken to reduce the threat. Short-term earthquake prediction and the development of earthquake early warning systems are currently regarded as this kind of efforts by the mankind. In this direction an intensive process is under way in the modern world that can cardinaly change the principles of earthquake engineering and safety of people and material assets. Nevertheless there is a threat of creating unpredictable situation that can even result in devastating consequences. Therefore, the adoption of measure in another direction is also necessary. The reliability of the concept and Building Codes should be enhanced and from this standpoint measures' should be taken in two ways: to build new reliable buildings and to get rid of current unreliable ones. Over time vulnerable territories and infrastructure will stop being dangerous and seismic warning signal will be received quietly – it won't be necessary to run away!



METHODS TO REDUCE THE LOSSES AT CATASTROPHIC EARTHQUAKE

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Keywords: seismic; seismic insulation; rubber-metal; forecasting; unification.

In developed the improvement of seismic resistance of reinforced concrete framework large panel, large block and cast-in-situ buildings that is taking into account the application of seismic insulation systems. Are stated issues of earthquake problems in Georgia, Azerbaijan and Russia. Is mentioned that by application of seismic insulation systems the seismic impact on building is decreasing approximately up to 1.5 times.



METHODS TO REDUCE THE LOSSES AT CATASTROPHIC EARTHQUAKE

M. Bediashvili, G. Kipiani*

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ON FRAMEWORK BUILDING COLUMNS SEISMIC IMPACT EFFECT

M.Kalabegashvili, G.Kipiani, D.Tabatadze, D.Jankarashvili,

A.Tabatadze

(Georgian Technical University, M. Kostava str. 77, 0175, Tbilisi, Georgia)

Key words: earthquake, impact, oscillation, seismic resistance, column, waves, diagram, displacement.

The issue of earthquake caused seismic load, as of impact effect, on framework building columns influence study is considered.

Analysis of the strong earthquakes results is given, where it is mentioned, that damage of the part of buildings takes place just at the initial moment of the seismic load. It is underscored, that always creation of the transversal impact in the building vertical elements advances earthquake inertial forces. [1,2,3] The mechanical conception of the seismic processes, elaborated by the seismologists of the Far East branch of the Academy of Russian Federation is given, according to which the seismic radiation represents the propagation of mechanical impulse, that occurs in space under the laws of mechanics of impact.[4]

To examine the conclusion, made in these papers, that seismic impact causes framework building first floor columns cut, building column oscillation problem is considered, when it in the lower end, which may be fastened in point foundation or foundation plate, is under the impulse action in the impact mode. Regarding upper end the cases are considered, when it is immovable (fastened rigidly) or undergoes displacement, horizontal displacement and rotational displacement as well are implied, the value of

which depends on both, forces, excited by seismic load and building rigidity.



ECCE-WCCE-GSCE II International Conference "Seismics-2018"
"SEISMIC PROBLEMS IN THE PROTECTION OF CULTURAL HERITAGE MONUMENTS AND CIVIL CONSTRUCTION"

DECLARATION

On June 30 – July 1, 2018, in Tbilisi, Georgia, successfully was held the joint II International Conference "Seismic -2018" on topic: "Seismic Resistance in the Protection of Cultural Heritage Monuments and Civil Construction", organized by the "European Council of Civil Engineers" (ECCE), "Georgian Society of Civil Engineers" (GSCE), "World Council of civil Engineers"(WCCE), "Georgian National Academy of Sciences" and San-Diego State University.

In the conference were discussed important for our country and all seismic regions of the world issues related to seismic resistance problems in the protection of cultural heritage monuments and civil construction. The new concepts of seismic construction were discussed and as well as the possibilities of their implementation in construction norms. The attention was focused on new approaches and demands in this field, using modern computing methods and computer technologies, due that could potentially more effectively be studied and analysed the real behavior of buildings and structures at any intensity earthquake.

At the end of the conference, the organizations involved in it have been concluded, based on foreign and local experience, to establish in Tbilisi, Georgia, on the basis of Georgian Society of Civil Engineers and Georgian Technical University, the specialists groups for:

- § Scientific study of seismic insulation systems and creation of proper construction base-organization;
- § Learning, developing and implementing new methods of tower buildings construction;
- § For the development of temporary technical regulations and norms corresponding to the analysis and experimental examination of basalt-plastic structures on seismic loads.

According to the Declaration adopted by the Presidents of the "European Council of Civil Engineers" (ECCE), "Georgian Society of Civil Engineers" (GSCE) and "World Council of Engineers" (WCCE) on May 29-30, 2014, to continue holding of the conference on seismic resistance construction issues every 2 years.

The undersigned express the hope that international governmental authorities, donors and other international organizations can support these issues, their in-depth discussion that will lead to a positive decision.

Włodzimierz Szymczak
Acting President of ECCE

Alfonso Gonzalez Fernandez
President of WCCE

Iuri Svanidze M. ASCE
President of GSCE

**Thank you very much
for your attention**