



J.J. Strossmayer University of Osijek  
Faculty of Civil Engineering Osijek

Project Team Members

Vladimir Sigmund - *principal investigator*  
Ivica Guljaš  
Damir Markulak  
Damir Varevac  
Petar Brana  
Mirjana Bošnjak-Klečina  
Jurko Zovkić  
Davorin Penava  
Đurđica Matošević  
Tanja Kalman-Šipoš  
Marin Grubišić  
Goran Gazić  
Mario Galić  
Ivan Kraus  
Ervin Kožoman  
Damir Džakić

International Advisory Group

Golubka Nechevska-Cvetanovska & Veronika Shendova  
*University Ss. Kiril and Metodij, IZiIS, Skopje, Macedonia, FYR*  
Mete Sozen & Santiago Puyol  
*Purdue University, Indiana, USA*  
Jochen Schwarz  
*Bauhaus University, Weimar, Germany*  
Matej Fischinger & Tatjana Isaković  
*University of Ljubljana, Slovenia*  
Christoph Butenweg  
*Rheinisch-Westfälische Technische Hochschule Aachen, Germany*  
Mehmed Čaušević  
*University of Rijeka, Croatia*  
Đorđe Lađinović  
*University of Novi Sad, Serbia*  
Mustafa Hrasnica  
*University of Sarajevo, Bosnia and Herzegovina*

## Supported by

This project has been supported in part by Croatian Science Foundation under the project 3013.



### Sponsors

*The realization of research is possible through the material support of related companies and organizations. In this respect, the sponsorship services of your company will be a crucial event in the success of research. Your sponsorship will not only enable us to accomplish research, but will also add great significance to this important meeting. It will be our honor and pleasure to see the name of your company among the list of sponsors and we look forward to your positive answer.*

### Contact

Josip Juraj Strossmayer University of Osijek  
Faculty of Civil Engineering Osijek  
Crkvena 21  
Osijek HR-31 000  
tel. +385 31 540 070  
fax. +385 31 540 071  
web [www.gfos.unios.hr](http://www.gfos.unios.hr)  
OIB 04150850819  
Hypo Alpe-Adria Bank d.d.  
IBAN HR0425000091102002438  
BIC HAABHR22

Prof.dr.sc. Vladimir Sigmund, principal investigator  
e-mail [ekozoman@gfos.hr](mailto:ekozoman@gfos.hr)

### For more information about FRAMA Benchmark

web [www.framed-masonry.com](http://www.framed-masonry.com)  
e-mail [contest@framed-masonry.com](mailto:contest@framed-masonry.com)



Josip Juraj Strossmayer  
University of Osijek  
Croatia

## FRAMA-2015 International Benchmark

*Framed-Masonry Composites for  
Modelling and Standardization*

HrZZ Research Project  
I-2478-2014

*1st Announcement*



Faculty of Civil Engineering  
Osijek

The existence of contradictions regarding seismic design of RC frames infilled with masonry (FRAMED-Masonry) have led to the deconstruction of the composite framed-masonry structural system. Many building codes contain warnings about the interaction of frames and infill walls but are mostly silent on providing recommendations and bounds on their proper proportioning.

FRAMA-2015 is a blind prediction competition in which competing teams are invited to predict the nonlinear seismic behaviour of a spatial frame reinforced concrete structure infilled with masonry designed for medium ductility level according to the EC8 provisions.

The blind prediction provided by each team will be assessed based on the results obtained with 1:2.5 scaled 3D building structure. It will be tested within the Croatian research project on the IZIIS shaking table.

The FRAMA-2015 International Benchmark, is part of the Croatian research project named "Framed-Masonry Composites for Modeling and Standardization" and is aimed at comparing and validating the numerical tools commonly used for seismic design verification of RC frames infilled with masonry walls.

The participants of the FRAMA-2015 Blind test Challenge are expected to submit two reports containing their results, 1st report on numerical modeling (numerical models based on design data) and 2nd report containing the numerical models based on actual material and ground motion data recorded during the shake table test.

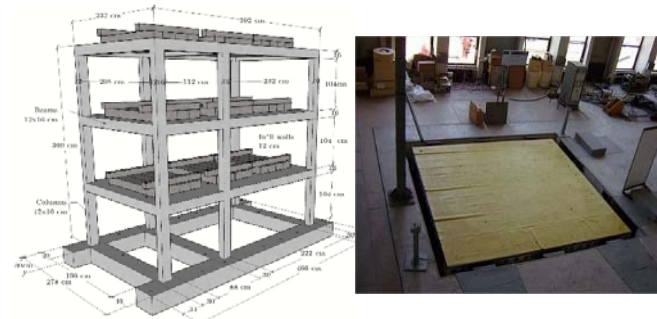
One final synthesis of the participants reports will be published by the organizer.

## Purpose

Specific goals of the shake table test and related validation testing are aiming at gaining further insight into modelling and seismic design verifications for infill panels; improvement of the structural strength, stiffness and deformation capacity and consideration of the of openings in infill panels.

Final idea is to upgrade the infill panels into a reliable structural element that could be brought by improvements of the "infills provisions" of EN 1998-1 and development of "infills provisions" for EN 1998-3.

## FRAMA 3D Model



Mock-up 3D Model and shaking table at IZIIS – DYNLAB

[www.iziis.edu.mk/urediteme/iziisrsquos-laboratory-shaking-tables.html](http://www.iziis.edu.mk/urediteme/iziisrsquos-laboratory-shaking-tables.html)

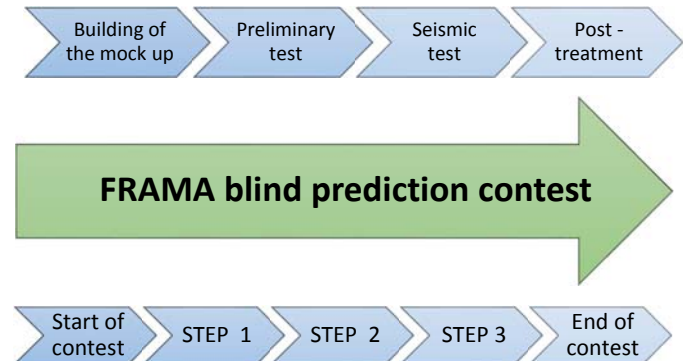
## Participants will have

- access to the design data and input ground motion and should predict the expected seismic response
- access to the experimental results and could modify their numerical modelling in order to improve the agreement between numerical and experimental results
- free attendance to the Post-FRAMA2015 Workshop

## General organization

- **announcement of contest** May 2015
- **STEP 1** 1st report on numerical modeling (numerical models based on design data)
- **STEP 2** 2nd report on numerical modeling (numerical models based on actual material and ground motion data recorded during the shake table test)
- **STEP 3** Post-FRAMA2015 Workshop „Seismic design of framed-masonry buildings“ (where a Synthesis of the participants reports will be delivered)
- **announcement of winners** December 2015

**NOTICE:** Participation is not anonymous. All participants have to be registered with the local organizers and their names and affiliations will be pulished in the final report.



**May 2015** **December 2015**