

## MOpis raziskovalnega dela (*Research work description*)

1. Članica UL (*UL member*):

Fakulteta za gradbeništvo in geodezijo / Faculty of Civil and Geodetic Engineering

2. Ime, priimek in elektronski naslov mentorja/ice (*Mentor's name, surname and email*):

Matija Gams, mgams@fgg.uni-lj.si

3. Raziskovalno področje (*Research field*):

2.01.04 Potresno inženirstvo / 2.01.04 Earthquake Engineering

4. Opis raziskovalnega dela (*Research work description*):

Vključuje morebitne dodatne pogoje, ki jih mora izpolnjevati kandidat/ka za mladega raziskovalca/ko, ki niso navedeni v razpisu za mlade raziskovalce (*It includes any additional conditions that the candidate for a young researcher must meet, which are not listed in the call to tender for young researchers.*).

*Slov.:* Usposabljanje mladega raziskovalca(e) bo potekalo na doktorskem študiju Grajeno okolje na Fakulteti za gradbeništvo in geodezijo Univerze v Ljubljani. Usposabljanje bo potekalo v okviru raziskovalnega programa P2-0185 Potresno inženirstvo.

Področje raziskovanja bo potresna odpornost zidanih konstrukcij. Odziv teh konstrukcij na potresno obtežbo je namreč razmeroma zapleten, saj je zidovje krhek, nehomogen in anizotropen material. Dodatno je arhitektura sodobnih stavb pogosto nepravilna in nesimetrična v tlorisu in po višini in z velikimi odprtinami na južni strani stavbe. Te nepravilnosti so za zidane stavbe velik problem, saj povzročajo koncentracije napetosti in neenakomerne razporeditve obremenitev. Zato je težko zagotoviti enakomerno razporeditev potresnih sil in dobro potresno obnašanje z velikim sipanjem energije.

Kandidat se bo ukvarjal s potresno odpornostjo sodobnih zidanih stavb grajenih v tehnologiji povezanega zidovja iz zidakov iz porobetona. Ključna naloga bo raziskati interakcijo zidovja in zidnih vezi ter s pridobljenim znanjem izboljšati postopke projektiranja in gradnje.

V sklopu usposabljanja bo potrebno izvesti eksperimentalne raziskave potresne odpornosti zidov na vzorcih v naravni velikosti, odziv preučiti in ga simulirati z naprednimi računalniškimi simulacijami. Na podlagi pridobljenih znanj se bo pripravilo priporočila za boljše projektiranje (enačbe za oceno nosilnosti, napotki za položaje, velikost in armaturo zidnih vezi).

Za potrebe eksperimentalnega dela je zaželeno, da ima kandidat praktične izkušnje s področja gradbeništva, za potrebe numeričnega dela pa osnovno znanje programiranja/modeliranja in željo po spoznavanju in uporabi naprednih numeričnih modelov in principov modeliranja.

Kandidat(ka) mora izpolnjevati vse kriterije razpisa in imeti magistrsko izobrazbo na področju tehničnih znanosti. Zahtevano je znanje angleškega jezika. Prednost bodo imeli kandidati z izkušnjami na področju zidarstva in uspešno opravljenim razgovorom s predvidenim mentorjem.

*Eng.:* The training of the young researcher will take place within the doctoral program *Built Environment* at the Faculty of Civil and Geodetic Engineering, University of Ljubljana. The training will be carried out within the research program P2-0185 *Earthquake Engineering*.

The research field will be the seismic resistance of masonry structures. The response of such structures to seismic loading is relatively complex, since masonry is a brittle, heterogeneous, and anisotropic material. Additionally, the architecture of modern buildings is often irregular and

asymmetrical in plan and elevation, with large openings on the southern side of the building. These irregularities present a major problem for masonry buildings, as they cause stress concentrations and uneven load distribution. Consequently, it is difficult to ensure uniform distribution of seismic forces and good seismic performance with high energy dissipation.

The candidate will research seismic resistance of modern masonry buildings constructed using confined masonry technology with aerated concrete blocks. The key task will be to investigate the interaction between masonry and tie-columns and, based on the knowledge gained, improve design and construction procedures.

As part of the training, experimental research on the seismic resistance of walls will need to be carried out on full-scale specimens; their response will be analysed and simulated using advanced computer simulations. Based on the acquired knowledge, recommendations will be prepared for improved design (equations for estimating load-bearing capacity, guidelines for the placement, size, and reinforcement of wall ties).

For the experimental part, practical experience in civil engineering is desirable, while for the numerical part, basic knowledge of programming/modeling and an interest in learning and applying advanced numerical models and modeling principles are required.

The candidate must meet all the criteria of the call and hold a master's degree in a technical field. Knowledge of English is required. Preference will be given to candidates with experience in masonry construction and a successful interview with the prospective supervisor.

5. Priloge, ki jih je treba priložiti ob prijavi (*Documents required to be submitted with the application*):

**potrdilo o doseženi izobrazbi (*proof of completed education*)**

- kandidat z zaključenim magistrskim študijskim programom (2. bolonjska stopnja) (*candidate who has completed a Master's degree (2nd Bologna level)*):
  - o diplomska listina / potrdilo o zaključku študijskega programa (*diploma certificate / certificate of completion of the study programme*)
  - o priloga k diplomi / potrdilo o opravljenih obveznostih (*diploma supplement / official transcript of records containing all grades obtained in the study programme*)
- kandidat, ki še ni zaključil študija na 2. stopnji (*candidate who has not yet completed a Master's degree*):
  - o potrdilo o do sedaj opravljenih obveznostih z ocenami magistrskega študijskega programa, s katerim se bo kandidat prijavil na doktorski študij (*official transcript of records listing all courses and grades obtained so far in the Master's degree programme on the basis of which the candidate will apply for enrollment in a doctoral degree programme.*)

**nagrade** – univerzitetna Prešernova nagrada ali Prešernova nagrada članice Univerze v Ljubljani oz. druga enakovredna nagrada (*awards, e.g. Prešeren Prize of the University of Ljubljana, Prešeren Prize of a University of Ljubljana member and/or another equivalent award*)

**bibliografija** (*bibliography*)

**življenjepis** (*CV*)

**motivacijsko pismo** (*motivation letter*)

**opis dosedanjega sodelovanja pri raziskovalnem delu** (*description of the candidate's research work*)

**osnutek idejne zasnove raziskovalnega dela** (*preliminary research proposal*)

**priporočilno pismo** (*letter of recommendation*)

**druge priloge** (*other attachments*):