

Opis 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):

David Antolinc, david.antolinc@fgg.uni-lj.si

3. Raziskovalno področje (Research field):

Gradbeništvo / Potresno inženirstvo (Civil and Structural Engineering / 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.:

Mladi raziskovalec/ka se bo usposabljal/a na doktorskem študiju Grajeno okolje, Fakulteta za gradbeništvo in geodezijo, Univerza v Ljubljani, z možnostjo izpopolnjevanja na uglednih institucijah po svetu. Tema doktorske disertacije mladega raziskovalca bo usklajena z raziskavami raziskovalne programske Potresno inženirstvo (P2-0185), ki sodeluje v mednarodnih projektih in združenjih, kar zagotavlja, da bodo raziskave aktualne in usklajene na mednarodnem nivoju. Delovno mesto mladega raziskovalca/ke na področju gradbeništva/potresnega inženirstva vključuje interdisciplinarni pristop k raziskovanju, kar je v skladu z resolucijo o krepitvi potresne varnosti do leta 2050. Glavni cilj je pripraviti družbo na bodoče potrese in zaščititi ljudi ter grajeno okolje, ob upoštevanju raznolikosti obstoječega stavbnega fonda in hitrega razvoja novih konstrukcijskih sistemov in materialov.

Sodobna arhitektura narekuje večje transparentne steklene površine stavbnega ovoja, ki lahko v primeru potresne obtežbe na objekte predstavljajo večje tveganje za poškodbe krhkega stekla in posledično nevarnost za uporabnike stavbe. V pripravi je izdaja novega Evrokoda 10 namenjenega projektiranju konstrukcijskega stekla in steklenih fasad, ki ne predvideva uporabe konstrukcijskega stekla za prevzem dela potresne obtežbe. Kljub temu je potrebno preveriti obnašanje teh sistemov med potresno obtežbo in zagotoviti varovanje steklenih elementov pred njihovo krhko hipno porušitvijo. V prihodnosti bo potrebno nadgraditi in posodobiti nastajajoči Evrokod 10 in na določenih delih tudi Evrokod 8 v katerem bodo podana specifična pravila za projektiranje tovrstnih konstrukcij na potresnih območjih. V strokovni javnosti s tega področja je veliko odprtih vprašanj in tematik, mladi/a raziskovalec/ka pa bo imel/a priložnost sodelovati pri tovrstnih raziskavah. V splošnem so to teme, ki se uvrščajo tudi v enega izmed treh raziskovalnih stebrov programske skupine, ki so: (1) potresno-odporno projektiranje in utrditev obstoječih objektov, (2) metode in orodja za vzpostavitev potresno-odpornega grajenega okolja ter (3) nove tehnologije, materiali in konstrukcije za trajnostni razvoj z upoštevanjem vpliva potresnega tveganja.

Raziskave mladega raziskovalca/ke bodo usmerjene v eno izmed naslednjih tem:

- razvoj seizmičnih pritrdilnih elementov in detajlov za strukturne steklene fasade in steklene konstrukcijske elemente na osnovi eksperimentalnih in numeričnih analiz,
- izboljšanje in razvoj postopkov projektiranja konstrukcijskega stekla in steklenih fasad na potresnih območjih ali potresne utrditve obstoječih objektov,
- prispevanje k razvoju novega standarda za konstrukcijsko steklo Evrokod 10.

Kandidat mora izpolnjevati vse kriterije iz razpisa. Zaželeno je magistrska izobrazba s področja gradbeništva ali strojništva, ni pa nujna, ter izkazan interes za raziskovanje s področja eksperimentalne in numerične analize konstrukcij, potresnega inženirstva, gradbeništva ali drugih ved, ki jih povezuje potresno inženirstvo. Prednost imajo kandidati z izkušnjami na področju numeričnega modeliranja konstrukcij, laboratorijskih preiskav in razumevanjem projektiranja potresno odpornih konstrukcij. Dodatne informacije lahko dobite na naslovu david.antolinc@fgg.uni-lj.si.

Eng.:

The young researcher will be trained in the PhD study program of Built Environment at the Faculty of Civil Engineering and Geodesy, University of Ljubljana, with the possibility of additional training at reputable institutions

abroad. The topic of the young researcher's doctoral dissertation will be aligned with the research agenda of the Earthquake Engineering Research Programme (P2-0185), which participates in state-of-the-art research international projects and associations. The position of young researcher in the field of civil or earthquake engineering requires an interdisciplinary research approach, which is in line with the Resolution on Strengthening Earthquake Safety by 2050. The main goal is to prepare society for future earthquakes, protect people and the built environment, taking into account the diversity of the existing building stock and the rapid development of new structural systems and materials.

Modern architecture requires larger transparent façade glass surfaces, which can increase the risk of brittle glass failure during the event of an imposed earthquake load and represent hazardous structural behaviour for the occupants of the building. Currently, a new Eurocode 10 is being prepared for the design of structural glass and glass facades, which does not consider the use of structural glass as seismic structural elements and neither the specific rules for the protection of structural glass elements against the seismic loads. Nevertheless, it is necessary to verify the behaviour of these systems during seismic loading and to ensure the protection of glass elements against their nature of brittle failure. In the future, it will be necessary to upgrade and update the emerging Eurocode 10 and in particular sections Eurocode 8, which will provide specific rules for the design of such structures in seismic areas.

There are many open questions and topics in the professional community in this field, and the young researcher will have the opportunity to participate in mentioned research. In general, these topics also align with one of the three research pillars of the research group, which are: (1) earthquake-resistant design and strengthening of existing buildings, (2) methods and tools for establishing an earthquake-resistant built environment, and (3) new technologies, materials and structures for sustainable development taking into account the impact of seismic risk.

The research of the young researcher will be focused on one of the following main topics:

- improvement of design procedures for structural glass and glass facades in seismic areas or seismic strengthening of existing buildings,
- development of seismic connection details and structural details for structural glass facades and structural glass elements based on experimental and numerical analyses,
- contribution to the development of the new standard for structural glass Eurocode 10.

The candidate has to fulfil all the criteria from the public call. A master degree in civil or mechanical engineering is desirable, as well as demonstrated interest in research in the field of experimental and numerical analysis of structures, structural systems, earthquake engineering, civil engineering and sciences related to earthquake engineering. Preference will be given to candidates who have experience in numerical structural modelling, experimental laboratory work and understand earthquake-resistant design of structures. Additional information can be obtained at david.antolinc@fgg.uni-lj.si.

5. Priloge, ki jih kandidat priloži k prijavi (*Documents that the candidate submits with the application*):

- diplomska listina/potrdilo o zaključku študijskega programa** (*diploma certificate for study programme, with which the candidate has enrolled/ will enroll in a doctoral degree programme*)
- priloga k diplomi/ potrdilo o opravljenih obveznostih** (*official transcript of all the grades for study programme, with which the candidate has enrolled/will enroll in a doctoral degree programme*)
- potrdilo o do sedaj opravljenih obveznostih z ocenami študijskega programa, s katerim se bo kandidat prijavil na študij** (*official transcript of all the grades the candidate has received so far for the study programme, with which the candidate will enroll to a doctoral degree programme*)
- nagrade** (*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*)