

Kratek opis usposabljanja mladega raziskovalca (*Short description of the Young Researcher's training*)

1. Raziskovalna organizacija (*Research organisation*):

Univerza v Ljubljani, Fakulteta za gradbeništvo in geodezijo

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

Tatjana Isaković, tatjana.isakovic@fgg.uni-lj.si

3. Šifra in naziv raziskovalnega področja (*Research field*):

2.01.04 Potresno inženirstvo

4. Kratek opis usposabljanja mladega raziskovalca (*Short description of the Young Researcher's training*):

Navedite tudi morebitne druge zahteve, vezane na usposabljanje mladega raziskovalca (npr. znanje angleškega jezika, izkušnje z laboratorijskim delom, potrebne licence za usposabljanje...).

slo:

Armirano betonske povezane stene so eden najbolj pogostih konstrukcijskih sistemov, ki se uporabljajo v stanovanjskih stavbah, saj omogočajo nastanitev velikega števila ljudi na razmeroma majhnem področju. V gosto naseljenih urbanih področjih Evrope je delež takšnih stavb 30% - 70%. Ne glede na to je trenutno znanje o njihovem potresnem odzivu pomanjkljivo in ga bi bilo treba občutno izboljšati. Za določene vrste sten, kot so npr. povezane stene (stene z odprtinami), celo osnovni mehanizmi potresnega odziva niso povsem pojasnjeni. Zaradi pomanjkljivega znanja so postopki za projektiranje stavb z armirano betonskimi stenami nezanesljivi in nepopolni. Posledično se lahko takšne stavbe pri močnih potresih resno poškodujejo, kar lahko povzroči ogromne direktne in indirektno izgube. To se je pokazalo tudi v nedavnih potresih.

Zato bo poglobljen namen usposabljanja razvoj zanesljivega in učinkovitega postopka za projektiranje stavb z armiranobetonskimi stenami, ki bi naj izboljšal njihovo potresno varnost in sposobnost hitre obnove po potresih. Posebna pozornost bo namenjena stenam z odprtinami, katerih potresni odziv je še posebej zapleten, postopki za projektiranje pa še posebej nezanesljivi in nepopolni. Nedavne raziskave so jasno pokazale, da je odziv takšni sten v veliki meri odvisen od njihove interakcije s prečkami in ploščami. Ta interakcija pa je bila v preteklosti pogosto močno podcenjena.

Za razvoj novega in zanesljivega postopka za projektiranje je potrebna eksperimentalna podpora. Zato od mladega raziskovalca pričakujemo, da bo aktivno sodeloval pri zasnovi, izvedbi eksperimentov in obdelavi podatkov. Na osnovi eksperimentalnih podatkov bo ustrezno nadgrajen numerični model, ki se že nekaj let razvija in uspešno uporablja na UL FGG. Slednji bo uporabljen za razvoj novega postopka za projektiranje in za študije potresnega tveganja. V parametričnih študijah in študijah potresnega tveganja bomo posebno pozornost namenili trenutni praksi projektiranja in konstruiranja obravnavanih stavb v Sloveniji in Evropi, saj je eden izmed glavnih pričakovanih rezultatov usposabljanja izboljšava določil ustreznih standardov za projektiranje.

Mladi raziskovalec bo svoje znanje razširil in dopolnil v okviru različnih predmetov, organiziranih v okviru doktorskega študija, in sicer v skladu s predvideno raziskovalno nalogo.

eng:

Buildings with reinforced concrete walls have been one of the most frequently used structural systems housing many people in a relatively limited area. In Europe, the share of this type of buildings in densely populated urban areas is in the range 30% - 70%. In spite of that the knowledge about their seismic response is incomplete and should be considerably improved. For some types of walls (e.g. RC coupled walls) even the basic mechanisms of the seismic response are not completely revealed. Due to the lack of knowledge, the seismic design procedures for RC wall buildings are unreliable and incomplete. Consequently, these types of buildings can be seriously damaged during the strong earthquakes and the related direct and indirect losses can be huge. This has been demonstrated in recent earthquakes.

Thus the main purpose of the training will be development of the reliable and effective seismic design procedure for buildings with RC walls, which is intended to considerably improve the seismic safety and resilience of these buildings. A special attention will be devoted to RC coupled walls, since their seismic response is quite complex and the design procedure quite unreliable and coarse. There is a strong experimental evidence that their response to a great extent depends on their interaction with coupling beams and slabs. This interaction is often underestimated in the regular design.

For the development of the new and reliable design procedure the experimental support is needed. Therefore, it is expected that the PhD candidate will be actively involved in the organisation, execution and data processing of the related experiments. The experimental data will be further used to develop the reliable numerical models in support of the new design procedure and seismic risk studies of buildings with RC walls. For this purpose, the numerical model, which has been developed and successfully used at University of Ljubljana for several years, will be extended. In the risk and parametric studies, which will be used to evaluate the new design procedure, the special attention will be devoted to the current practice in Slovenia and Europe, since one of the main expected results of the training is to improve the related design standards.

It is expected that the PhD candidate will be trained through different courses in order to obtain/extend the knowledge, which is needed for the foreseen research.