

SDC 2021 Virtual Competition Outline

Due to the nature of the restrictions imposed by COVID-19, there is a need to reimagine the scope of the EERI Seismic Design Competition (SDC) to fit the format of the upcoming EERI Annual Meeting which was to be held in Seattle, WA in March of 2021. As always, the Student Leadership Council's (SLC) goal is to work with student chapters around the world and create an exciting environment for us all to explore and share in Earthquake Engineering together, and we're eager to keep that goal alive in the face of the new challenges presented to us. In an effort to remain as transparent as possible, we would like to inform you of not only the decision we have reached as a team, but the process in which we reached this decision. After many months of deliberation we have decided the best option for the 2021 SDC is to hold a virtual competition. We deliberated several options, both virtual and in-person, and spent countless hours in meetings with numerous EERI committees trying to figure out the safest and most beneficial way to serve the undergraduate students. We discussed the possibility of teams shipping us their towers to be tested with the SLC and live streamed, as well as an option to hold regional competitions in lieu of the one large one typically held during the Annual Meeting, and also an option for a hybrid competition with hands-on and virtual options. We had evaluated each option with the deepest scrutiny and had even received input from academics, researchers, folks in industry and even previous SLC officers to make sure we covered every single aspect of each option we deliberated. We were also lucky enough to have input from many of you who had completed our survey and ultimately helped us reach our final decision. So due to the nature of the COVID-19 pandemic, we decided that we do not feel safe asking students to meet to construct a balsa wood building this year. There's too much liability on the end of EERI if we ask teams to meet with the risk of anybody contracting COVID-19, and with the undergraduate students as the heart of EERI, we cannot in good faith risk anyone getting sick whatsoever. However, we believe we have created a new and engaging way to keep students involved through a virtual competition. There are fresh aspects for students to explore and we're so excited to see the incredible work we've seen from all teams in the past and the new teams this year. We are planning multiple webinars and tutorials this year for the teams so that all teams are comfortable with their ability to compete in the virtual competition, but most importantly, to learn and network with your peers and professionals. The specifics for these will be announced in the future as they are scheduled and will be held periodically throughout the year leading up to the virtual Annual Meeting. Below you will find the introduction to the 2021 SDC. If you have any comments, questions or concerns at this time you can direct your emails to the SLC Co-Presidents (slc@eeri.org), but upon release of the next set of documents regarding the competition you can direct all of your emails to the SDC Chairs (sdc@eeri.org). All of us at EERI and the SLC want to thank all of you for bearing with us as we tried to plan the best competition we could possibly envision during this time. We hope to make this the biggest competition yet and the best learning experience for undergraduates around the world and we hope you and your families stay safe, happy and healthy.

Cheers,

Preetish Kakoty & Mike Morano

2020-2021 EERI SLC Co-Presidents

PREFACE

The following competition format represents a completely virtual competition enabling students to participate and engage from their respective locations of residence. The competition will consist of four stages/progressions, each of which will require participating teams to submit deliverables that will be counted towards the competition's conclusion. Each of the four assignments will be released separately and due on distinct dates throughout the academic year, replacing the need of the previous design proposal submission. Scoring details for each section will be described in detail along with the release of section rules and guidelines. Teams will be invited to participate in the competition based on their 2021 SDC Interest Forms. This document encapsulates the competition's major modifications and does not replace the Official Rules and Design Guide documents; further announcements will follow.

INTRODUCTION/OVERVIEW

The Mayor of Seattle made a plea to acquire urgent funds for increasing hospital space to catch up with the healthcare demand arising from COVID-19. In addition to the construction of new hospital buildings, an existing hospital in the Greater Seattle Area was selected for a structural addition that would substantially increase its patient capacity. FEMA has pledged funding for the construction of the addition, and the City of Seattle, as a client, has issued a call for Expression of Interest (EOI) to engineering firms/consultants to materialize this project. As Expression of Interest is usually the first step in the tender process, your SDC interest form will serve as a (faux) Expression of Interest document for this project. To provide a safe and equal opportunity environment to EERI student chapters/competing teams throughout the world, this year's Seismic Design Competition will emulate a multistage design project related to this hospital, a brief description of its format is presented below.

FORMAT

The four virtual deliverables for the competition this year are envisioned as follows but may be subject to change (teams will have approximately 3 weeks to submit each deliverable from the date it is assigned):

1- Geotechnical Engineering/Seismicity Aspect

Teams will be tasked to provide a geotechnical memo answering a series of conceptual/hypothetical questions related to potential issues for the original building design. Based on given site information, questions might target the following topics: site classification, target design spectrum, and ground motion selection. Conceptual questions may include unique site geology and geotechnical hazards.

2- Structural Engineering Aspect

Teams will be tasked to model a scaled balsa wood structure (given construction documents) using their preferred numerical analysis software (SAP2000, ETABS, etc.). The model will be subjected to two ground motions, representing earthquakes with different return periods. Teams will be asked to rigorously explain their modeling assumptions with engineering reasoning for

their model features. The performance predictions of the model for the given ground motions will be compared to a professional benchmark model to assess their model accuracy.

Additionally, teams will be tasked to design an addition onto the given (existing) structure provided certain requirements/rules, yet with some flexibility. This task will be fundamental for the tasks provided through the forthcoming aspects.

3- Architectural/Environmental Impact and Cost Aspect

Teams will be tasked to architecturally design the facade for the given structural model considering the environmental impact, aesthetics and sustainability of the building. Carrying on from the structural aspect, teams will be tasked to conceptually design the addition to the given model with an emphasis on cost reduction, energy-efficiency and aesthetic appeal.

4- Retrofitting Aspect

Teams will be tasked to conduct a retrofitting assessment for the given structure (existing) in respect to the additional structure incorporation. Teams will be required to come up with ideas to retrofit the scaled balsa wood model that would imitate real retrofitting strategies providing detailed description for their analysis and design processes. Additional conceptual questions might be added to allow for more research and understanding of the retrofit process.

Presentations and poster rules and guidelines will be updated to fit the new virtual format and will contribute to the overall scoring. These events will be held during the annual meeting and it is envisioned we will still announce the Top 3 finishers at the closing ceremony as usual.

ADDITIONAL ACTIVITIES

The SLC is also planning a series of events complimenting the deliverables of the Seismic Design Competition and also beyond that to provide opportunities to network with peers and other professionals in the EERI community. We wanted to highlight a couple of them here, but we are constantly brainstorming on finding out unique ways to make sure all of us take something with us at the completion of the competition.

Online Tutorials: We are working with stakeholders in the EERI community to create a series of online tutorials to provide learning opportunities which will directly help in fulfilling the goals of the competition, but also hone skills which are transferable as you take steps to build a career in the profession. While creating these tutorial content, we are also mindful that these skills are transferable for future Seismic Design Competitions when it returns to normal “shake-day” format.

Post-Earthquake Reconnaissance Workshop: SLC will also hold it’s flagship Post-Earthquake Reconnaissance workshop online. This workshop will be an introduction on the methods and procedures that need to be followed to assess damage after an earthquake and tag buildings ensuring safety of the residents. We are working on having great speakers who will enlighten us from their personal experiences of conducting post-earthquake reconnaissance work.

Quiz Bowl: We are also planning an informal online quiz bowl, where we will get together to spend some fun time navigating through earthquake related trivia. We will potentially have multiple of such events and the format will be such that the participants will get the chance of knowing their peers as well as network with professionals.