

To: Faculty Development Committee

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Title: EFFECTIVE REINFORCING FOR EARTHQUAKE RESISTANCE OF
GREEN BUILDING STRUCTURAL WALLS

Abstract: The aim of this Faculty Enhancement Grant is to primarily support a graduate student to generate a set of experimental data from small-scale tests and engineer detailed plans to overcome current laboratory limitations in order to pursue large-scale dynamic shake table based research on structural walls for green buildings. The subject of the research involves investigating the behavior of insulated concrete form (ICF) grid walls, which are an evolving green building construction method but whose performance characteristics are not well quantified or understood. ICF grid wall systems are a more sustainable alternative to traditional concrete walls via reduced material, forming requirements and enhanced thermal characteristics. Experiments are proposed to study the effects of reinforcement detailing and the recycled material form on structural response characteristics in order to move the system closer to wider adoption in new buildings. The performance of these types of systems needs to be ultimately researched at full-scale under dynamic loads to develop rational design procedures. Portland State University's iSTAR laboratory has unique capabilities with potential for such research, but a number of challenges need to be overcome. The outcomes of the research are to provide preliminary data set and implementable laboratory enhancement designs as basis for developing proposals for externally funded research projects, with positive impact on junior faculty and graduate research program development.