

## ***Interactive comment on “Reliability-based strength modification factor for seismic design spectra considering structural degradation” by Sonia E. Ruiz et al.***

### **Anonymous Referee #1**

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This paper describes an approach to obtain strength modification factors of design spectra for degrading structures, based on probabilistic seismic hazard analyses, to avoid running nonlinear time history analyses for SDOFs. The paper is well written, well structured, and comprehensive. The presented methodology is clear, and the results and figures support the findings of the Authors.

It is this Reviewer’s opinion that the paper is suitable for publication in NHESS, subject to the following minor revisions: 1. An important aspect when calculating the proper modification of response spectra, besides the structural degradation and the soil contribution, is the soil-structure interaction, which might further modify the response spec-

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trum. NIST2012 describes a procedure of accounting for SSI in the response spectra calculation. This modification is more pronounced for stiff structures resting on soft soil. Can you please comment on how you believe that SSI could further modify the response spectra that you calculated? Also, a reference to this matter could be made in the Introduction section. 2. In Section 3.4, please provide some indicative properties for the soil at the CU station, in order to support your statement that it is firm ground. 3. Please change 2.4 to 3.4 in Line 177. 4. Please provide some comments on why you chose  $T_N=T_s$  as the bound from which the lengthening of T remains constant. 5. Figures 4, 5, and 6 lack commentary in the text (simple reference is made). Please add your comments and discussion to those figures within the text, as the presented results are of interest to the reader. 6. In Figure 7, please add, whenever possible, a percent of the difference between  $S_a$  and  $I_{Np}$ . This will help the reader to quantify the effect of structural degradation. 7. In Lines 263-264, please rephrase “interrupted” with “dashed” and add “thick solid line”.

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