Response to the Reviewers' Comments:

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We are very grateful to the reviewers and the editors for their consideration and valuable time to review this work. The authors are highly obliged that the reviewers are raising questions and providing feedback that helps us in improving the overall quality of the work. Corrections are highlighted in **track changes mode** in the revised manuscript. The following are our responses to the comments from the reviewers.

Reviewer 3:

Reviewer's comment	Authors' response
Have you control the exception of page 97 of ASCE07-2016 for soft story in modelling: "Vertical structural irregularities of Types 1a, 1b, and 2 in Table 12.3-2 do not apply where no story drift ratio under design lateral seismic force is greater than 130% of the story drift ratio of the next story above. Torsional effects need not be considered in the calculation of story drifts."	• The authors are grateful for the reviewers' comment. • In this particular study, Vertical Structural Irregularity (Stiffness Irregularity) was considered as per the page 16 of IS 1893:2016. • As per the IS 1893:2016-stiffness irregularity criteria, drift shall be limited to 0.2% in the story with stiffening and also in all stories below in the frames with URM infills. • In this study, no such infills were modelled (only bare frames considered). • Criteria shown in the Figure. 4A (page 17) of IS 1893-2016 is considered to induce the soft story effect in the selected story levels.
As the assumption of special moment frame in the manuscript and obligatory control of "weak beam strong column "in special structures, so your example should have soft story? By controlling this criterion soft story shouldn't be existed.	• The authors are thankful to the reviewer for taking the time to go through each and every line of the script to recommend changes for improving the overall quality of the work. • This particular study considered the moment-resisting frames (MRF). • Sorry for the unnecessary sentence. We deleted the sentence and modified in the revised script (Section 2) as shown below: "The structural models are considered RC moment-resisting frames (MRF)."

In the manuscript only floor acceleration is considered for NSCs. But as you know and as mentioned in FEMA P-58 for example wall partitions are related to inter-story drift. So, it is a mixed process. How can you justify your assumption that only acceleration is important?	• The authors are thankful to the reviewer for the constructive comments. • The authors agree with the reviewer. Floor displacement spectra is a tool used to determine the seismic demands on displacement/drift sensitive components. But this particular study is limited to acceleration sensitive non-structural components. • This particular comment is addressed in "Introduction" section of the revised manuscript as follows: Based on the types of failure, NSCs can be classified as acceleration sensitive components and displacement/drift sensitive components [1]. Even though precise methods for reliably estimating seismic demand on both acceleration and displacement sensitive non-structural components are now available, simpler procedures are sometimes required in design scenarios [2]. National and international codes give several simpler formulas for calculating seismic demand on NSEs. The fundamental goal of many seismic codes in use in earthquake-prone regions is to estimate the maximum acceleration, and hence the maximum inertial force, caused by the predicted seismic shaking on NSC. As a result, the current study is limited to the acceleration-sensitive non-structural components. The acceleration failure is due to the inertial forces produced in the component. Suspended building utility systems, such as pipe systems and cable trays, and anchored or free-standing building utility systems or contents are examples of acceleration-sensitive non-structural components. 1. Pardalopoulos, S.I.; Pantazopoulou, S.J. Seismic Response of Nonstructural Components Attached on Multistorey Buildings. *Earthq. Eng. Struct. Dyn.* **2015**, *44*, 139–158, doi:10.1002/eqe.2466. 2. Perrone, D.; Filiatrault, A. Seismic Demand on Non-Structural Elements: Influence of Masonry Infills on Floor Response Spectra. In Proceedings of the 16th European Conference on Earthquake Engineering, Thessaloniki, Greece; 2018.
Simplified methods as introduced in paper: https://doi.org/10.1016/j.jcsr.2018.04.010 would be mentioned in introduction part.	• The authors are thankful to the reviewer for constructive comment. • This particular comment is addressed in "Introduction" section of the revised manuscript as follows: "It is important to keep in mind that the recent study [40] emphasized the performance-based seismic design of non-structural components. The accurate estimate of seismic demand in the performance evaluation of NSCs necessitates the adoption of an appropriate EDP. Fragility curves for NSCs are frequently represented in terms of floor spectral acceleration in loss estimate studies [41]. The approach given in FEMA P-58 [42] for estimating damage and loss is

	time-consuming and expensive, and a new direct loss measure (LM) was developed in the most recent study by Sani et al. [43]. The Hazus-MH 2 [44] provides four damage states for NSC damage assessment: slight, moderate, extensive, and complete. Damage is classified as Slight, Moderate, Extensive, or Complete by the fragility curves. However, the current study did not investigate the damage and loss estimation studies of NSC."
Damage state of NSCs should be stated based on Hazus–MH 2.	• The authors are thankful to the reviewer for constructive comment. • HAZUS- MH 2 describes four damage states: slight, moderate, extensive, and complete. The fragility curves classify damage as Slight, Moderate, Extensive, or Complete. These fragility curves are produced in NSC loss estimation studies and will be explored in future research. The spectral acceleration of the NSC can be considered as the reference engineering demand parameter (EDP) in the fragility study.
FEMA P-58 methodology can be used for loss estimation of NSCs to clear and upgrade the manuscript.	• The authors are thankful to the reviewer for the suggestion. • This particular comment is addressed in "Conclusions" section of the revised manuscript as follows: "It is also worth mentioning that peak floor accelerations were computed and used to generate floor response spectra, which may be used to quantify seismic losses related with NSEs. The FEMA P-58 approach will be used in future studies for NSC loss calculation by using the floor spectral acceleration as the reference engineering demand parameter (EDP)."
The nonlinear models are important. May be the nonlinear behavior affects the results. Only linear modeling under ground motion can't be rational. How can you justify this problem?	• The authors are thankful for the comment and suggestion. • The authors agree with the reviewer. The non-linear behaviour of the building/NSC affects the FRS, as observed in the literature. This particular study explored the effect of a soft story and its location on the FRS. Previous researchers did not study this effect. Hence, the authors limited to a linear analysis of building and NSC under strong ground motions. This study serves as a preliminary investigation for future studies to obtain more generalized research outcomes by considering the vertical structural irregularity.

	• This particular comment is addressed in Section 2 of the revised manuscript. "Early floor response spectrum techniques were based on the assumption that during earthquakes, buildings and NSCs remain in the linear elastic zone. Currently, the scope of this work is confined to structural systems that respond elastically. The inelastic behavior of the structure and/or NSC is outside the scope of this study but will be taken into account in future research. The elastic model of the structure employed as a reference case aims to imitate the theoretical behavior of the structures while ignoring nonlinear effects during the dynamic response."
In ref No:8, what is the name of the journal: In Proceedings of the Structures? Is the style correct?	• ref No:8 (In the revised script, ref No: 10) has been modified as follows: Challagulla, S.P.; Bhargav, N.C.; Parimi, C. Evaluation of Damping Modification Factors for Floor Response Spectra via Machine Learning Model. *Structures*, **2022**, *39*, 679–690.