

APR1400
Feedback on Advanced Copy Response to RAI 255-8285, Question 03.08.05-11
Prepared July 20, 2016

The following is the feedback for Parts a through d of the response:

(a) Acceptable; however, the first sentence states: “The total shear force at the top of the AB and EDG basemat from the equivalent static method have been compared with those from SSI analysis to provide justification of the use of equivalent static method.” Table 1 of the response presents the comparison of results. Since Table 1 provides comparisons at many elevations and also includes the DFOT structure (not just “top of the AB and EDG basemat”) the applicant is requested to revise the text to be consistent with the results presented in Table 1. Also, provide a heading in the first column of Table 1, to explain the values given below. Presumably, these are elevations in the structures.

The second paragraph of the RAI response, for Part (a), states: “The EDGB seismic responses are affected by the adjacent structures including the NI structures for soft soil case only. However, the enveloped design-basis seismic force of the EDGB is governed by that obtained from fixed-based analysis among nine SSI analysis and one fixed-base analysis cases. The ratio of the design-basis fixed-based case to design-basis SSI analysis case is greater than or equal to the amplification factors of ISRS determined from the SSSI analyses for the soft soil case. Therefore, the design-basis seismic response forces need not be increased to consider the SSI effects on the EDGB.” Explain why the last sentence refers to “the SSI effects on the EDGB” and not SSSI effects on the EDGB.

(b) Acceptable - Confirmatory

(c) The response did not provide sufficient information that was requested in Part c of the RAI to enable the staff to understand the analysis and design of the NI basemat. The applicant is requested to explain in sufficient detail the approach used including the following items:

1. The analysis models for each of the three structures - containment building, internal structures, and AB analyzed individually and the models used for the combined NI basemat model. Include figures in the RAI response or identify specific figures in the appropriate references (e.g., DCD, technical report(s)) that contain the information.
2. The boundary conditions in the individual superstructure models at the connection of the superstructure to basemat and beneath the basemat model to subgrade used

in the individual superstructure models. Similarly, in the case of the NI basemat model, describe the boundary conditions at the connection of each of the superstructures to the NI basemat model and beneath the NI basemat to the subgrade.

3. If soil springs are used to represent the subgrade in any of the individual superstructure analyses and/or the NI basemat model, describe these springs including what type of springs (e.g., constant Winkler type springs or varied across the foundation), if they were compression only springs, and how the spring values were calculated for seismic and for static loads.

4. How loads were applied from each individual superstructure onto the NI basemat model. It is understood that for some structures that had only brick type finite elements, only translational forces F_x , F_y , and F_z would be applied to the NI basemat model. For these types of structural models, identify the structures and confirm that all three forces at every node of all finite elements were applied to the NI basemat model. In the case of shell type finite elements and columns, describe in sufficient detail how translational forces (e.g., F_x , F_y , and F_z) were applied (e.g., at every node of all finite elements – shell and column elements) and how moments were applied.

5. In the advanced copy of the response, it states: “To consider out-of-plane moments and out-of-plane shear forces from the AB, the additional structural analysis is only performed in AB.” If translational forces were already determined from the AB superstructure analysis, explain why are out-of-plane shear forces developed along with the moments from an “additional structural analysis” for the AB.

6. What accelerations in X, Y, and Z directions are applied to the individual AB equivalent static analysis, the “additional structural analysis” for the AB, and the basemat in the NI basemat model. Explain how are these acceleration values determined (e.g., maximum accelerations at each node or floor elevation from the SASSI analysis output, ZPA from the ISRS at each floor level, or ...)

7. Explain what is meant by “new NI common basemat analysis.” Is there an old analysis and a new analysis? Explain what are the differences and purpose of each. Lastly, in the 5th paragraph, it states: “in the NI common basemat analysis, ...” Clarify whether this is in the “new NI common basemat analysis” or the old analysis.

(d) Technically Acceptable; however, since ACI 340R is discussed in the DCD, it should be identified in DCD Table 3.8-1 and in Section 3.8.7 – References. The implementation of the ACI 340R methodology to combine bending and axial loads in design will be reviewed in the next structural audit.