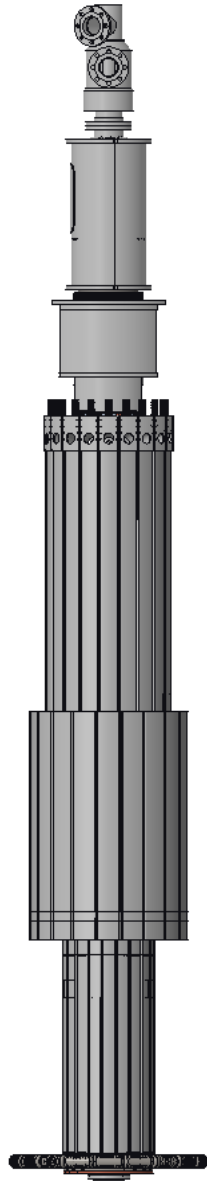


Target - Determination of Seismic Force

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Task: Determine the Equivalent Lateral Force applied to the system according to ASCE 7-16 Ch 13

$$I_p := 1.5$$

Importance factor for components containing toxic explosive or threshold quantities.

$$a_p := 1.0$$

Amplification factor for mechanical components constructed of high deformability materials. Table 13.6-1 [7]

Component Response modification factor for mechanical components constructed of high deformability materials. Table 13.6.1 [7]. Refactored according to DOE-STD-1020 Table 3-1 SDC2, Limit State C, as required by the STS NPH BOD [2].

Table 3-1: Response Modification Coefficients for Seismic Design of SDC-1 and SDC-2 SSCs

SDC	Limit State			
	A	B	C	D
1	ASCE/SEI 7-10, Use Risk Category II, I = 1.0 R _s = R (See Note 2)	ASCE/SEI 7-10, Use Risk Category II, I = 1.0 R _s = R/1.25 R _s ≥ 1.2	ASCE/SEI 7-10, Use Risk Category II, I = 1.0 R _s = R/1.5 R _s ≥ 1.2	ASCE/SEI 7-10, Use Risk Category II, I = 1.0 R _s = 1.2
2	N/A	ASCE/SEI 7-10, Use Risk Category IV, I = 1.5 R _s = R	ASCE/SEI 7-10, Use Risk Category IV, I = 1.5 R _s = R/1.2 R _s ≥ 1.2	ASCE/SEI 7-10, Use Risk Category IV, I = 1.5 R _s = 1.2

$$R_p := \frac{1.5}{1.2} = 1.25$$

Notes:

1. This table may be used to design SDC-1 and SDC-2 SSCs with various safety functions requiring limit states A, B, C, or D. These limit states are to be used when SDC-1 and SDC-2 SSCs are designed by IBC-2015.

$z_h := 1$ Relative height in the building. Assume the Core Vessel is an independent structure and the target assembly is attached at the highest elevation of the independent structure.

$$S_{DS} := 0.485g$$

Spectral acceleration, short period.
Soil Class D, Risk Category IV [3]

$$A_{p_min} := 0.3 \cdot S_{DS} \cdot I_p = 0.218 \cdot g$$

Minimum horizontal seismic lateral acceleration.
Eq. 13.3-3 [1]

$$A_{p_max} := 1.6 \cdot S_{DS} \cdot I_p = 1.164 \cdot g$$

Maximum horizontal seismic lateral acceleration.
Eq. 13.3-2 [1]

$$A_v := 0.2 \cdot S_{DS} = 0.097 \cdot g$$

Vertical force component. Ref [1] Section 13.3.1

$$E := \frac{0.4 \cdot a_p \cdot S_{DS}}{\frac{R_p}{I_p}} \cdot (1 + 2 \cdot z_h) = 0.698 \cdot g$$

Horizontal seismic design acceleration Eq. 13.3-1 [1]

References

- [1] ASCE 7-16 "Minimum Design Loads for Buildings and Other Structures"
- [2] S01030100-ESH10001 "STS Natural Phenomena Hazards Basis of Design"
- [3] Drawing package, "8800-ST0001 - Structural Notes, Legends and Abbreviations"