In Eq. 4-8b of ACI 371R, replace the term $\frac{2.5C_a}{R}$ with

$$\frac{S_{DS}}{\left(\frac{R}{I_e}\right)} \qquad (15.7\text{-}25)$$

In Eq. 4-9 of ACI 371R, replace the term $0.5C_a$ with

$$0.2S_{DS} \qquad (15.7\text{-}26)$$

15.7.10.7.1 Analysis Procedures The equivalent lateral force procedure is permitted for all concrete pedestal tanks and shall be based on a fixed-base, single degree-of-freedom model. All mass, including the liquid, shall be considered rigid unless the sloshing mechanism (i.e., the percentage of convective mass and centroid) is determined for the specific configuration of the container by detailed fluid–structure interaction analysis or testing. Soil–structure interaction is permitted to be included. A more rigorous analysis is permitted.

15.7.10.7.2 Structure Period The fundamental period of vibration of the structure shall be established using the uncracked structural properties and deformational characteristics of the resisting elements in a properly substantiated analysis. The period used to calculate the seismic response coefficient shall not exceed 2.5 s.

15.7.11 Boilers and Pressure Vessels

15.7.11.1 General

Attachments to the pressure boundary, supports, and seismic force-resisting anchorage systems for boilers and pressure vessels shall be designed to meet the force and displacement requirements of Section 15.3 or 15.4 and the additional requirements of this section. Boilers and pressure vessels categorized as Risk Categories III or IV shall be designed to meet the force and displacement requirements of Section 15.3 or 15.4.

15.7.11.2 ASME Boilers and Pressure Vessels

Boilers or pressure vessels designed and constructed in accordance with ASME BPVC shall be deemed to meet the requirements of this section provided that the force and displacement requirements of Section 15.3 or 15.4 are used with appropriate scaling of the force and displacement requirements to the working stress design basis.

15.7.11.3 Attachments of Internal Equipment and Refractory

Attachments to the pressure boundary for internal and external ancillary components (refractory, cyclones, trays, etc.) shall be designed to resist the seismic forces specified in this standard to safeguard against rupture of the pressure boundary. Alternatively, the element attached is permitted to be designed to fail prior to damaging the pressure boundary provided that the consequences of the failure do not place the pressure boundary in jeopardy. For boilers or vessels containing liquids, the effect of sloshing on the internal equipment shall be considered if the equipment can damage the integrity of the pressure boundary.

15.7.11.4 Coupling of Vessel and Support Structure

Where the mass of the operating vessel or vessels supported is greater than 25 percent of the total mass of the combined structure, the structure and vessel designs shall consider the effects of dynamic coupling between each other. Coupling with adjacent, connected structures such as multiple towers shall be considered if the structures are interconnected with elements that will transfer loads from one structure to the other.

15.7.11.5 Effective Mass

Fluid–structure interaction (sloshing) shall be considered in determining the effective mass of the stored material providing sufficient liquid surface exists for sloshing to occur and the T_c is greater than $3T$. Changes to or variations in material density with pressure and temperature shall be considered.

15.7.11.6 Other Boilers and Pressure Vessels

Boilers and pressure vessels designated Risk-Category IV, but not designed and constructed in accordance with the requirements of ASME BPVC, shall meet the following requirements:

The seismic loads in combination with other service loads and appropriate environmental effects shall not exceed the material strength shown in Table 15.7-4.

Consideration shall be made to mitigate seismic impact loads for boiler or vessel elements constructed of nonductile materials or vessels operated in such a way that material ductility is reduced (e.g., low temperature applications).

15.7.11.7 Supports and Attachments for Boilers and Pressure Vessels

Attachments to the pressure boundary and support for boilers and pressure vessels shall meet the following requirements: