

## APPENDIX

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### Notation

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$\delta_{CLE}$	Deck displacement limit for CLE level (m).
$\delta_{MCE}$	Deck displacement limit for MCE level (m).
$D^i_d$	Lateral design displacement of the isolation bearing on the $i^{\text{th}}$ pile at CLE level (m).
$f_{bo}$	Biaxial compressive strength of the concrete (KPa).
$f_{co}$	Uniaxial compressive strength of the concrete (KPa).
$K_0$	Lateral stiffness of the NSIW (kN/m).
$K_c$	Parameter controlling the projection shape of the concrete yield surface on the deviatoric plane.
$K_{\text{eff}}$	Equivalent lateral stiffness of the SISW (kN/m).
$(K'_{\text{eff}})$	
$k^i_{\text{eff-i}}$	Equivalent lateral stiffness of the $i^{\text{th}}$ isolation bearing (kN/m).
$k^i_i$	Initial stiffness of the $i^{\text{th}}$ friction pendulum system at the transverse direction (kN/m).
$k^i_{\text{fps}}$	Secondary stiffness of the $i^{\text{th}}$ friction pendulum system at the transverse direction (kN/m).
$m_0$	Designed mass of the wharf (t).
$R^i$	Curvature radius of the $i^{\text{th}}$ friction pendulum system at the transverse direction (m).
$S_d$	Spectral structural displacement of the SISW at CLE level (m).
$T_0$	Fundamental period of the NSIW (s).
$T_{\text{eff}}$	Fundamental period of the SISW (s).
$(T'_{\text{eff}})$	
$W$	Gravity design value of the wharf (kN).
$W^i$	Axial force on the the $i^{\text{th}}$ friction pendulum system at the transverse direction (kN).
$\xi_{\text{eff}}$	Equivalent viscous damping ratio of the SISW.
$\xi^i_{\text{eff-i}}$	Equivalent viscous damping ratio of the $i^{\text{th}}$ isolation bearing at the transverse direction.
$\xi^i_p$	Equivalent viscous damping ratio of the $i^{\text{th}}$ pile at the transverse direction.

$\mu^i$  Friction coefficient of the  $i^{\text{th}}$  friction pendulum system at the transverse direction.

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**Abbreviation**

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CDP	Concrete damaged plasticity, a material model in ABAQUS, adopts isotropic damaged elasticity in combination with isotropic tensile and compressive plasticity to represent the inelastic behavior of concrete.
CLE	Contingency level earthquake with a ground motion probability of exceedance of 10% in 50 years.
MCE	Maximum considered earthquake with a ground motion probability of exceedance of 2% in 50 years.
NSIW	Non-seismic-isolated wharves.
OLE	Operating level earthquake with a ground motion probability of exceedance of 50% in 50 years.
PBSD	Performance-based seismic design.
PGA	Peak ground acceleration.
SISW	Wharves with seismic isolation system.

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