

Concrete Cracking Amplification Factors for Lateral Loads on FWSC Shear Keys

- Concrete cracking amplification factor for lateral loads on FWSC shear keys is equal to 1.0, i.e. no amplification is applied to FWSC shear keys lateral loads to account for effects of concrete cracking
- Site-specific evaluation of concrete cracking effects presented in Appendix B of FWSC Seismic Analysis Report (WG3-U63-ERD-S-0001) showed that sliding analyses of FWSC **UC_{SSE}** model with full (uncracked concrete) stiffness and SSE damping provide seismic demands on the FWSC shear keys that bound the effects of concrete cracking
 - Comparisons of results from SSI analyses of FWSC **UC_{SSE}** model and FWSC **CR_{SSE}** model with reduced (cracked concrete) stiffness for shear forces and vertical accelerations demonstrated that design basis analyses of **UC_{SSE}** model provide bounding horizontal base driving forces and vertical reaction

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- FWSC sliding evaluations in Section 5.1 of FWSC Stability Analysis Report (WG3-U63-ERD-S-0002) provide lateral force demands on FWSC shear keys based on responses obtained from SSI and SSSI analyses of FWSC standalone and FWSC-CB combined **UC_{SSE}** models
- Sliding stability calculations in FWSC Concrete Fill Evaluation Report (SER-DMN-034) showed that separation of concrete fill and surrounding soil amplify lateral loads on FWSC shear keys
 - Lateral loads obtained from analyses of models representing maximum soil separations are bounding and used for structural evaluation
- Statement is added in new Revision 2 of Bounding Report (SER-DMN-032) and FSAR 3A.17.9.3 stating that design basis analyses of **UC_{SSE}** models bound concrete cracking effects on FWSC shear keys lateral load demands

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- Maximum magnitudes of driving forces for whole duration of the earthquake are calculated from results of analyses of CR_{SSE} and UC_{SSE} models for contact spring forces located at bottom of FWSC foundation
- Comparisons of maximum horizontal and vertical driving forces obtained from CR_{SSE} and UC_{SSE} models confirm conclusions in Appendix B of FWSC Seismic Analysis Report WG3-U63-ERD-S-0001 that sliding analyses of UC_{SSE} model provide lateral force demands on shear keys that bound concrete cracking effects

Soil Condition		LB		BE		UB	
		NS	EW	NS	EW	NS	EW
Maximum Vertical Seismic Driving Force (MN)	CR _{SSE} Standalone Model	87	87	100	100	111	111
	UC _{SSE} Standalone Model	87	87	103	103	124	124
Maximum Horizontal Seismic Driving Force (MN)	CR _{SSE} Standalone Model	91	86	89	94	83	111
	UC _{SSE} Standalone Model	99	89	101	98	93	118