

TABLE 1
 Ultimate Friction Factors and Adhesion for Dissimilar Materials

Interface Materials	Friction factor, tan [delta]	Friction angle [delta] degrees
* Mass concrete on the following foundation materials:		
* Clean sound rock.....	* 0.70	* 35
* Clean gravel, gravel-sand mixtures, coarse sand...	* 0.55 to 0.60	* 29 to 31
* Clean fine to medium sand, silty medium to coarse sand, silty or clayey gravel.....	* 0.45 to 0.55	* 24 to 29
* Clean fine sand, silty or clayey fine to medium sand.....	* 0.35 to 0.45	* 19 to 24
* Fine sandy silt, nonplastic silt.....	* 0.30 to 0.35	* 17 to 19
* Very stiff and hard residual or preconsolidated clay.....	* 0.40 to 0.50	* 22 to 26
* Medium stiff and stiff clay and silty clay.....	* 0.30 to 0.35	* 17 to 19
* (Masonry on foundation materials has same friction factors.)		
* Steel sheet piles against the following soils:		
* Clean gravel, gravel-sand mixtures, well-graded rock fill with spalls.....	* 0.40	* 22
* Clean sand, silty sand-gravel mixture, single size hard rock fill.....	* 0.30	* 17
* Silty sand, gravel or sand mixed with silt or clay	* 0.25	* 14
* Fine sandy silt, nonplastic silt.....	* 0.20	* 11
* Formed concrete or concrete sheet piling against the following soils:		
* Clean gravel, gravel-sand mixture, well-graded rock fill with spalls.....	* 0.40 to 0.50	* 22 to 26
* Clean sand, silty sand-gravel mixture, single size hard rock fill.....	* 0.30 to 0.40	* 17 to 22
* Silty sand, gravel or sand mixed with silt or clay	* 0.30	* 17
* Fine sandy silt, nonplastic silt.....	* 0.25	* 14
* Various structural materials:		
* Masonry on masonry, igneous and metamorphic rocks:		
* Dressed soft rock on dressed soft rock.....	* 0.70	* 35
* Dressed hard rock on dressed soft rock.....	* 0.65	* 33
* Dressed hard rock on dressed hard rock.....	* 0.55	* 29
* Masonry on wood (across grain)	* 0.50	* 27
* Steel on steel sheet pile interlocks.....	* 0.30	* 17
* Interface Materials (Cohesion)		
* Adhesion c+a, (psf)		
* Very soft cohesive soil (0 - 250 psf)	* 0 - 250	
* Soft cohesive soil (250 - 500 psf)	* 250 - 500	
* Medium stiff cohesive soil (500 - 1000 psf)	* 500 - 750	
* Stiff cohesive soil (1000 - 2000 psf)	* 750 - 950	
* Very stiff cohesive soil (2000 - 4000 psf)	* 950 - 1,300	