

Building on Strong and Safe Foundations

E. Cost Estimating

The cost data provided in Appendix E were developed in 2006 for the First Edition of FEMA 550 for select communities along the Gulf of Mexico. The applicability or accuracy of the data to other coastal areas has not been investigated. Although *relative* costs between foundation systems may apply in other coastal regions, users of the manual should verify current *actual* costs for any given location.

Breakdown of Foundation Costs			
Foundation Type	Average Foundation Costs (\$)	Elevation Above Grade	Unit Costs per Square Foot (sf)
Open			
Case A: Braced Timber Pile	13,536	0 to 5	11
	17,554	5 to 10	15
	22,720	10 to 15	19
	Not Evaluated	Above 15	
Case B: Steel Pipe Pile with Concrete Column and Grade Beam	32,500	0 to 5	27
	36,024	5 to 10	30
	37,500	10 to 15	31
	Not Evaluated	Above 15	
Case C: Timber Pile with Concrete Column and Grade Beam	31,700	0 to 5	26
	36,288	5 to 10	30
	37,900	10 to 15	32
	Not Evaluated	Above 15	
Case D: Concrete Column and Grade Beam	13,500	0 to 5	11
	16,860	5 to 10	14
	18,500	10 to 15	15
	Not Evaluated	Above 15	
Case G: Concrete Column and Grade Beam with Integral Slab	18,000	0 to 5	15
	21,847	5 to 10	18
	24,000	10 to 15	20
	Not Evaluated	Above 15	
Closed			
Case E: Reinforced Masonry - Crawlspace	12,254	0 to 4	10
	14,000	4 to 8	12
Case F: Reinforced Masonry - Stem Wall	12,458	0 to 4	10

NOTES

1. This rough order of magnitude (ROM) cost estimate is based upon May 2006 figures for concrete, labor, equipment, and materials. Variations due to labor/equipment/materials shortages are anticipated and should be taken into account when using these costs.
2. Costs presented herein should not be construed to represent actual costs to the homebuilder, but should be utilized as an order of magnitude estimate only.
3. Pile driving mobilization/demobilization can be reduced if several homes are constructed at the same time in the same area, thereby realizing an economy of scale.

4. Costs presented are based upon the general designs in this document. A 1,200-sf footprint for a single-story home at an assumed 130-mph wind speed, elevated to the average height for that foundation, is the basis for the estimates. When differences in elements of construction occur, such as number of piles or amount of concrete, an alternate cost is presented. The cost estimate presented represents the conservative approach to the designs in this document. If value engineering, different materials, or a more cost-effective design are implemented, these costs may be reduced.
5. Costs presented herein include applicable taxes, contractor general and home office overhead, profit, and other sub-tier contract costs.
6. Concrete costs, unless otherwise noted, include bracing, reinforcing, formwork, finishing (if necessary), and mobilization and demobilization of the contractor. Due to the anticipated shortage of skilled labor for concrete, variability in this area should be anticipated.
7. Costs experienced by the builder or contractor will be dependent upon contract agreements, local price variations in labor, material, equipment, and availability.
8. Costs for steel are highly variable and dependent upon supply. Variability in costs for steel should be anticipated. Costs for steel include materials and labor for installation.
9. Costs for block in closed foundations is based upon standard natural gray medium weight masonry block walls, including blocks, mortar, typical reinforcing, normal waste, and walls constructed with 8" x 8" x 16" blocks laid in running bond. Add for grouting cores poured by hand to 4-foot heights.

Case A: Braced Timber Pile									
	Unit of Measure	Material	Labor	Equip.	Subtotal	Number of Piles	Length of Piles Driven	Total If to drive	Subtotal
Site Prep	ls				500.00	—	—	—	\$500
Minimum job charge for Driving	ls	—	—	—	5,000.00	—	—	—	\$5,000
Number of Piles: 60									
Over 30' to 40' (800 lf per day)	If	3.3	1.7	0.9	5.90	60	30	1,800	\$10,620
Bolts and Miscellaneous	Per Column				15.00	60			\$900
Wood Pile Connection to House	Per Pile				55.00	60			\$3,300
Galvanized Bracing Rod and Turnbuckles	Per Pile				40.00	60			\$2,400
Total for Piles									\$22,720
Number of Piles: 42									
Over 30' to 40' (800 lf per day)	If	3.3	1.7	0.9	5.90	42	30	1260	\$7,434
Bolts and Miscellaneous	Per Column				15.00	42			\$630
Wood Pile Connection to House	Per Pile				55.00	42			\$2,310
Galvanized Bracing Rod and Turnbuckles	Per Pile				40.00	42			\$1,680
Total for Piles									\$17,554
Number of Piles: 28									
Over 30' to 40' (800 lf per day)	If	3.3	1.7	0.9	5.90	28	30	840	\$4,956
Bolts and Miscellaneous	Per Column				15.00	28			\$420
Wood Pile Connection to House	Per Pile				55.00	28			\$1,540
Galvanized Bracing Rod and Turnbuckles	Per Pile				40.00	28			\$1,120
Total for Piles									\$13,536

ls = lump sum

lf = linear foot

Case B: Steel Pipe Pile with Concrete Column and Grade Beam									
Site Prep	ls				500.00	—	—	—	\$500
Minimum job charge for Driving	ls	—	—	—	5,000.00	—	—	—	\$5,000
Steel Piles Driven									
	Unit of Measure	Material	Labor	Equip.	Subtotal	Number of Piles	Length of Piles	Total lf to drive	Subtotal
Steel Piles Driven	lf	11	3.1	0.9	15.00	28	30	840	\$12,600
Bolts and Miscellaneous	Per Column				25.00	28			\$700
Total for Piles									\$13,300
Concrete Grade Beam									
	Unit of Measure	Material	Labor	Equip.	Subtotal	Number of cy	Equipment Charge		Subtotal
Soil Excavation, Medium material, 75 cy per hour (57 m ³ /hr)	cy	—	0.54	1.29	1.83	55	500		\$601
Grade beams	cy	225	22	7.5	254.50	32			\$8,144
Steel	ea				100.00	32			\$3,200
Total for Grade Beams									\$11,945
Concrete Columns @ 10 feet									
	Unit of Measure	Material	Labor	Equip.	Subtotal	Number of cy/ Columns	Number of Columns		Subtotal
18" (46 cm) square or round columns	cy	225	35	7.5	267.50	0.74	12		\$2,375
Steel	Column				150.00		12		\$1,800
Anchors	Column				49.55		12		\$595
Angles	Column				42.45		12		\$509
Subtotal for Concrete Columns									\$5,279
Total for Case B									\$36,024

ls = lump sum lf = linear foot cy = cubic yard ea = each

Case C: Timber Pile with Concrete Column and Grade Beam								
	Unit of Measure	Material	Labor	Equip.	Subtotal	Number of Piles	Length of Piles	Total lf to Drive
Site Prep	ls				500.00	—	—	—
Minimum job charge for Driving	ls	—	—	—	5,000.00	—	—	—
Timber Piles Driven								
Number of Wooden Piles: 42								
Over 30' to 40' (800 lf per day)	lf	3.3	1.7	0.9	5.90	42	30	1,260
Bolts and Miscellaneous	Per Column				15.00	42		
Total for Piles								
Concrete Grade Beam								
	Unit of Measure	Material	Labor	Equip.	Subtotal	Number of cy	Equipment Charge	
Soil Excavation, Medium material, 75 cy per hour (57 m ³ /hr)	cy	—	0.54	1.29	1.83	55	500	
Grade beams	cy	225	22	7.5	254.50	32		
Steel	ea				100.00	32		
Total for Grade Beams								
Concrete Columns including Pile Caps @ 10 feet								
	Unit of Measure	Material	Labor	Equip.	Subtotal	Number of cy/ Columns	Number of Columns	
18" (46 cm) square or round columns	cy	225	35	7.5	267.50	0.74	12	
Steel	Column				150.00		12	
Anchors	Column				49.55		12	
Angles	Column				42.45			
Subtotal for Concrete Columns								
Grand Total for Foundation Shown								

ls = lump sum

lf = linear foot

cy = cubic yard

ea = each

Case D: Concrete Column and Grade Beam								
	Unit of Measure	Material	Labor	Equip.	Subtotal	Number of cy	Equipment Charge	Subtotal
Soil Excavation, Medium material, 75 cy per hour (57 m ³ /hr)	cy	—	0.54	1.29	1.83	50	500	\$592
Grade beams	cy	225	22	7.5	254.50	31		\$7,890
Steel	ea				100	31		\$3,100
Total for Grade Beams								\$11,582
Concrete Columns @ 10 feet Elevation								
	Unit of Measure	Material	Labor	Equip.	Subtotal	Number of cy per Column	Number of Columns	Subtotal
18" (46 cm) square or round columns	cy	225	35	7.5	267.50	0.74	12	\$2,375
Steel	Column				150.00		12	\$1,800
Anchors	Column				49.55		12	\$595
Angles	Column				42.45		12	\$509
Subtotal for Concrete Columns								\$5,279
Grand Total for Foundation Shown								\$16,861

cy = cubic yard

ea = each

Case G: Concrete Column and Grade Beam with Integral Slab								
	Unit of Measure	Material	Labor	Equip.	Subtotal	Number of cy	Equipment Charge	Subtotal
Soil Excavation, Medium material, 75 cy per hour (57 m ³ /hr)	cy	—	0.54	1.29	1.83	75	500	\$637
Interior Concrete	cy	225	35	7.50	267.50	15		\$4,013
Grade Beams	cy	225	35	7.50	267.50	31		\$8,293
Steel	ea				100.00	31		\$3,100
WWF	ea				35.00	15		\$525
Total for Grade Beams								\$16,568
Concrete Columns @ 10 feet Elevation								
	Unit of Measure	Material	Labor	Equip.	Subtotal	Number of cy per Column	Number of Columns	Subtotal
18" (46 cm) square or round columns	cy	225	35	7.50	267.50	0.74	12	\$2,375
Steel	Column				150		12	\$1,800
Anchors	Column				49.55		12	\$595
Angles	Column				42.45		12	\$509
Subtotal for Concrete Columns								\$5,279
Grand Total for Foundation Shown								\$21,847

cy = cubic yard

ea = each

WWF = welded wire fabric

Case E: Reinforced Masonry – Crawlspace								
Crawlspace								
	Unit of Measure	Material	Labor	Equip.	Subtotal	Number of cy	Equipment Charge	Subtotal
Soil Excavation, Medium material, 75 cy per hour (57 m ³ /hr)	cy	—	0.68	1.43	2.11	24	500	\$551
Footings	cy	225	22	7.5	254.50	20		\$5,090
Steel	cy				100.00	20		\$2,000
Total for Footings (not including steel)								\$7,641
Concrete Columns @ 4 feet								
	Unit of Measure	Material	Labor	Equip.	Subtotal	Number of cy per Column	Number of Columns	Subtotal
16" (46 cm) square or round columns piers	cy	225	35	7.5	267.50	0.40	6	\$642
Steel	Column				150.00		6	\$900
Anchors	Column				49.55		6	\$297
Angles	Column				42.45		6	\$255
Subtotal for Concrete Columns								\$2,094
Concrete Walls								
	Unit of Measure	Material	Labor	Equip.	Subtotal	Number of sf		Subtotal
Concrete Block Walls	sf	5.23	4.53	1	10.76	420		\$4,519
Grand Total for Foundation Shown (Footings + Concrete Columns + Concrete Walls)								\$14,254

cy = cubic yard

sf = square foot

Case F: Reinforced Masonry – Stem Wall								
	Unit of Measure	Material	Labor	Equip.	Subtotal	Number of cy	Equipment Charge	Subtotal
Soil Excavation, Medium material, 75 cy per hour (57 m ³ /hr)	cy	—	0.54	1.29	1.83	34	500	\$562
Footings	cy	225	22	7.5	254.50	20		\$5,090
Steel	cy				100.00	20		\$2,000
Bracing	ls							\$1,500
Backfill	cy	4	0.6	1.45	6.05	130		\$787
Total for Stem Wall Footings								\$9,152
Concrete Walls								
	Unit of Measure	Material	Labor	Equip.	Subtotal	Number of sf		Subtotal
Concrete Block Walls	sf	5.23	4.53	1	10.76	420		\$4,519
Grand Total for Foundation Shown								\$13,671

cy = cubic yard ls = lump sum sf = square foot