

RAM JACK HELICAL PILE DESIGN AID

TABLE 1 - New Construction Pile Capacities^{1,2,3} (e = 0)

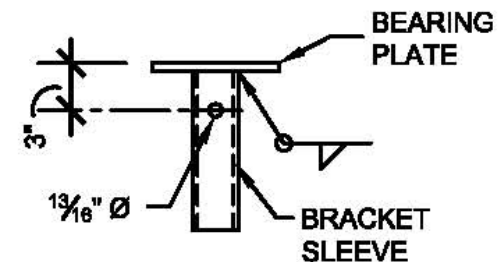
Pile Diameter (in)	Torque Rating (ft-lbs)	K _t	Fully Braced Pile (kip)		5'-0 Unbraced Length (kip)		10'-0 Unbraced Length (kip)	
			Ultimate	Allow. (S.F.=2)	No Sleeve	5'-0 Sleeve	No Sleeve	10'-0 Sleeve
2 3/8	4,000	10	40.0	20.0	20.0	N/A	8.0	20.0
2 7/8	8,000	9	72.0	36.0	36.0	N/A	18.5	36.0
3 1/2	14,000	7	98.0	49.0	49.0	N/A	35.5	49.0
4 1/2	23,000	6	138.0	69.0	69.0	N/A	69.0	N/A

NOTES:

- 1) Recommended capacities indicated in TABLE 1 are based on the lowest value between the mechanical strength of the pile and the torque correlation method and assumes no load eccentricity (e) is being resisted by the pile.
- 2) A fully braced pile is defined in the International Building Code (IBC) in Chapter 18. Please ensure the definition is clearly understood before relying on the fully braced pile capacities listed in TABLE 1.
- 3) A pile not defined as fully braced per the IBC is considered unbraced by default. The minimum unbraced lengths are defined based on the soft and firm soil conditions the piles will be installed in. A 5'-0 unbraced length is applicable to a pile being installed in a firm soil (N-value ≥ 5). A 10'-0 unbraced length is applicable to a pile being installed in a soft soil (N-value < 5).

TABLE 2 – Standard New Construction Pile Brackets

Part Number	Pile Diameter	Allowable Load Capacity	Bearing Plate Size	Bracket Sleeve and Length
4074	2 3/8"	24.2 kips	PL 5/8"x 8"x 0'-8	2 7/8" dia. x 8"
4075	2 7/8"	20.6 kips	PL 5/8"x 4"x 0'-8	3 1/2" dia. x 10"
4079	2 7/8"	36.5 kips	PL 5/8"x 8"x 0'-8	3 1/2" dia. x 10"
4076	3 1/2"	65.1 kips	PL 1"x 9"x 0'-9	2 7/8" dia. x 10"
4077	4 1/2"	75.8 kips	PL 1"x 9"x 0'-9	3 1/2" dia. x 10"



*Custom sizes are available. Please contact engineering department for bracket sizing.



RAM JACK HELICAL PILE DESIGN AID

TABLE 3 - Capacity of Piles with Side Load Brackets^{1,2,3,4}

Pile Dia. (in.)	Torque (ft-lbs)	K _t	No Sleeve (5'-0 unbraced length)			Bracket with External Sleeve (5'-0 & 10'-0 unbraced length)				
			Bracket	eccentricity (in.)	Allow. Capacity	Bracket	Sleeve Dia. (in.)	eccentricit y (in.)	5'-0 Sleeve Capacity	10'-0 Sleeve Capacity
2 3/8	4,000	10	4045	1.937	7.25 kips	4038	2 7/8	2.625	19 .0 kips	10.75 kips
2 7/8	8,000	9	4038	2.625	20.3 kips	4021	3 1/2	3.125	33.5 kips	22.5 kips
3 1/2	14,000	7	4021	3.125	20.0 kips	4021.55	4 1/2	4.000	49.0 kips	45.25 kips
4 1/2	23,000	6	4032	4.000	42.0 kips	N/A	N/A	N/A	N/A	N/A

NOTES:

- 1) A pile with a side load bracket is defined in the International Building Code (IBC) in Chapter 18 as laterally unbraced. The minimum unbraced lengths are defined based on the soft and firm soil conditions the piles will be installed in. A 5'-0 unbraced length is applicable to a pile being installed in a firm soil (N-value ≥ 5). A 10'-0 unbraced length is applicable to a pile being installed in a soft soil (N-value < 5).
- 2) The eccentricity of on a helical pile is measured from the center of the pile to the face of the footing per ICC-ES AC358.
- 3) The eccentricities shown in Table 3 are for the brackets indicated.
- 4) The capacities shown in Table 3 are based on the assumption that the footing/grade beam has been properly prepared and that the bracket has a smooth and flush fit to the footing/grade beam. If the brackets do not have a proper and flush fit to the footing/grade beam, the eccentricity on the pile will be greater resulting in a higher bending stress and a lower capacity than that shown in Table 3.

RAM JACK HELICAL PILE DESIGN AID

TABLE 4 – Maximum Pile Spacing for **Minimally Reinforced** Concrete Floor Slab per ACI 318 ^{1,2}

f'c (psi)	Floor Slab Depth (in)	A _s , min. per ACI (in ²)	Live Load (psf)	Maximum Pile Spacing		Pile Load (kip)	
				1 & 2 Span	3 Span	1 & 2 Span	3 Span
2,500	4"	0.06	40	5'-9"	6'-5"	3.02 k	3.78 k
			50	5'-5"	6'-1"	2.98 k	3.72 k
			100	4'-4"	4'-10"	2.84 k	3.55 k
	5"	0.075	40	6'-10"	7'-7"	4.80 k	6.00 k
			50	6'-5"	7'-2"	4.73 k	5.91 k
			100	5'-3"	5'-10"	4.50 k	5.63 k
	6"	0.09	40	7'-9"	8'-8"	7.00 k	8.75 k
			50	7'-5"	8'-3"	6.89 k	8.62 k
			100	6'-1"	6'-10"	6.56 k	8.20 k
	8"	0.12	40	10'-4"	11'-7"	14.95 k	18.78 k
			50	9'-10"	11'-0"	14.50 k	18.15 k
			100	8'-1"	9'-1"	13.07 k	16.50 k
3,000	4"	0.07	40	6'-0"	6'-9"	3.32 k	4.16 k
			50	5'-8"	6'-4"	3.27 k	4.09 k
			100	4'-6"	5'-1"	3.12 k	3.90 k
	5"	0.08	40	7'-2"	8'-0"	5.28 k	6.60 k
			50	6'-9"	7'-7"	5.19 k	6.49 k
			100	5'-6"	6'-2"	4.95 k	6.19 k
	6"	0.10	40	8'-2"	9'-1"	7.70 k	9.62 k
			50	7'-9"	8'-8"	7.58 k	9.47 k
			100	6'-5"	7'-2"	7.21 k	9.02 k
	8"	0.13	40	10'-10"	12'-0"	16.43 k	20.00 k
			50	10'-4"	11'-6"	16.01 k	20.00 k
			100	8'-6"	9'-6"	14.45 k	18.05 k

NOTES:

- 1) The maximum pile spacing shown are for floor slabs constructed of normal weight concrete (150 pcf) with minimum reinforcement per ACI 318.
- 2) The floor slab spans shown assumes the minimum floor slab reinforcement is placed in the center of the slab. Longer spans can be achieved if the slab reinforcement is verified to be larger and/or placed below the center line of the floor slab.

RAM JACK HELICAL PILE DESIGN AID

TABLE 5 – Ram Jack Helical Pile/Anchor Shaft Sizes and Properties

Central Pile Shaft	2 3/8"	2 7/8"	3 1/2"	4 1/2"
Weight (lb/ft)	4.43	7.00	8.67	19.0
Outside Diameter (in)	2.375	2.875	3.500	4.500
Inside Diameter (in)	1.995	2.441	2.992	3.624
Wall Thickness, t (in)	0.190	0.217	0.254	0.438
Cross-Sectional Area, A (in ²)	1.304	1.812	2.590	5.589
Yield Strength, F_y (ksi)	65.0	65.0	65.0	65.0
Tensile Strength, F_u (ksi)	80.0	80.0	80.0	80.0
Moment of Inertia, I (in ⁴)	0.784	1.611	3.432	11.66
Elastic Section Modulus, S (in ³)	0.660	1.121	1.961	5.183
Plastic Section Modulus, Z (in ³)	0.909	1.536	2.682	7.255
Radius of Gyration, r (in)	0.775	0.923	1.151	1.445
Torsional Constant, J (in ⁴)	1.568	3.222	6.865	23.320
Torsional Yield Moment (ft-lb)	4,130	7,800	12,100	23,000
Torsional Plastic Moment (ft-lb)	4,470	8,500	13,000	25,200
Default Torque Correlation Factor, K_t (ft ⁻¹)	10	9	7	6
Ram Jack Torque Rating (ft-lb)	4,000	8,000	14,000	23,000



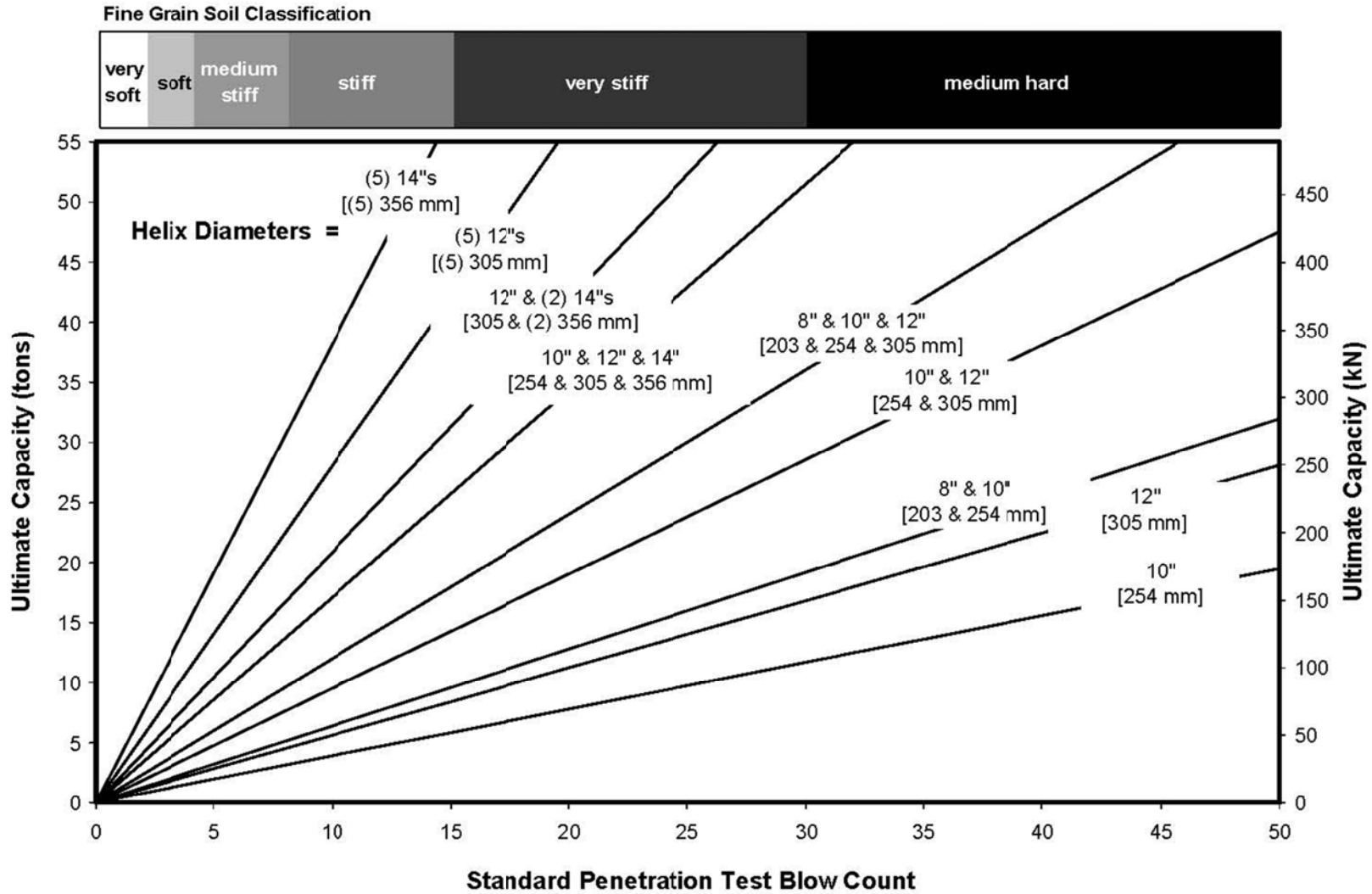
RAM JACK HELICAL PILE DESIGN AID

TABLE 6 – Ram Jack Helical Plate Load Diameters and Load Ratings

Helical Plate (in)	Central Pile Shaft (in)	Effective Area (ft ²)	Plate Thickness (in)	Maximum Allowable Load Rating (lbs)
8	2 3/8	0.318	3/8	47,500
10		0.515		43,500
12		0.755		37,500
8	2 7/8	0.304	3/8	73,000
10		0.500		64,000
12		0.740		45,500
12		0.740	1/2	55,400
14		1.02		46,800
16		1.35		40,200
8		3 1/2	0.283	3/8
10	0.479		66,300	
12	0.719		65,700	
12	0.719		1/2	80,500
14	1.00			64,000
16	1.33			58,000
10	4 1/2		0.435	1/2
12		0.675	94,500	
14		0.959	83,000	
16		1.290	76,000	

RAM JACK HELICAL PILE DESIGN AID

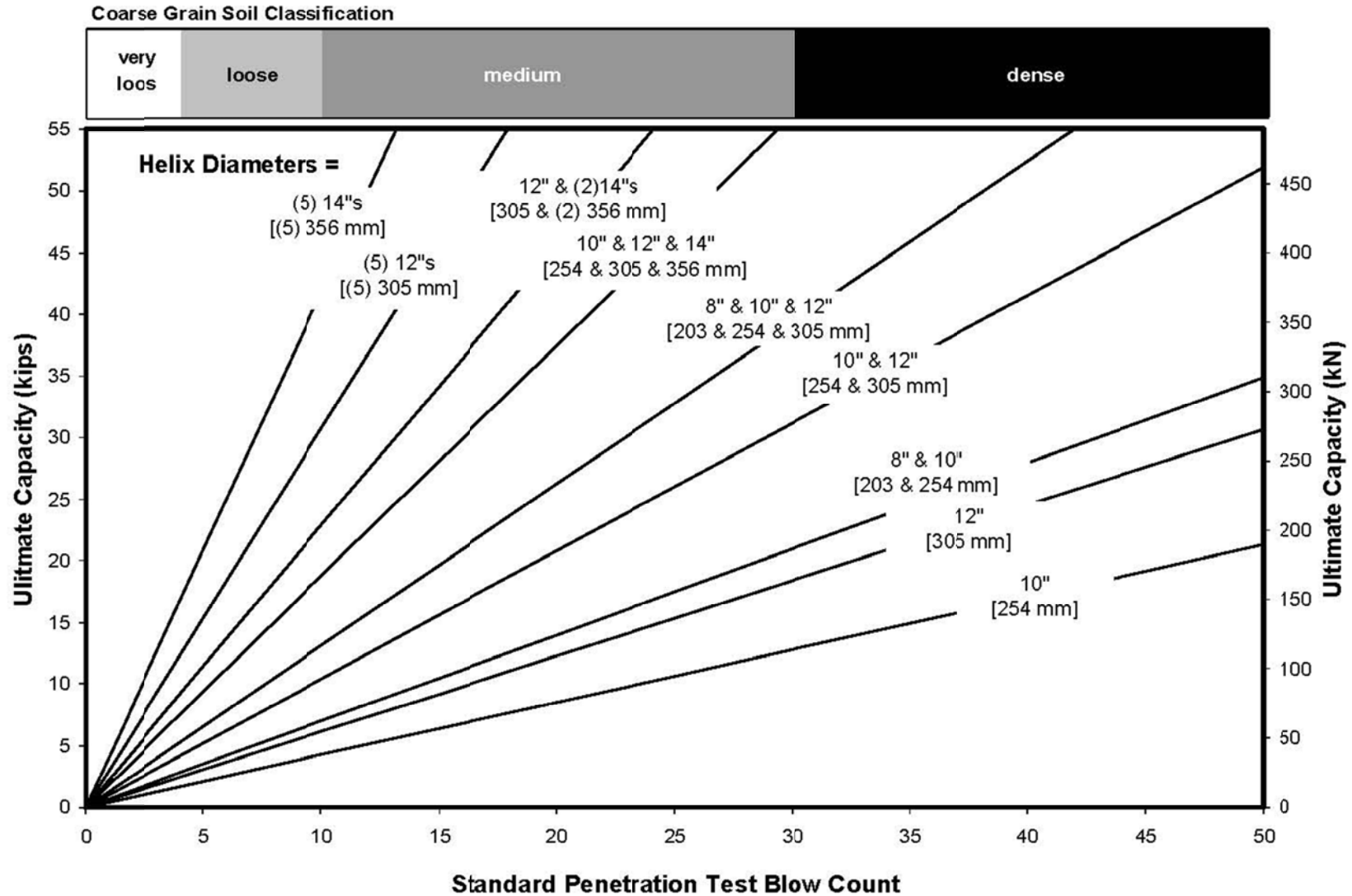
FIGURE 1 – Helical Plate Configuration Selection Diagram for Fine Grained Soils¹



¹ Perko, H.A., *Helical Piles – A Practical Guide to Design and Installation*, John Wiley, 2009

RAM JACK HELICAL PILE DESIGN AID

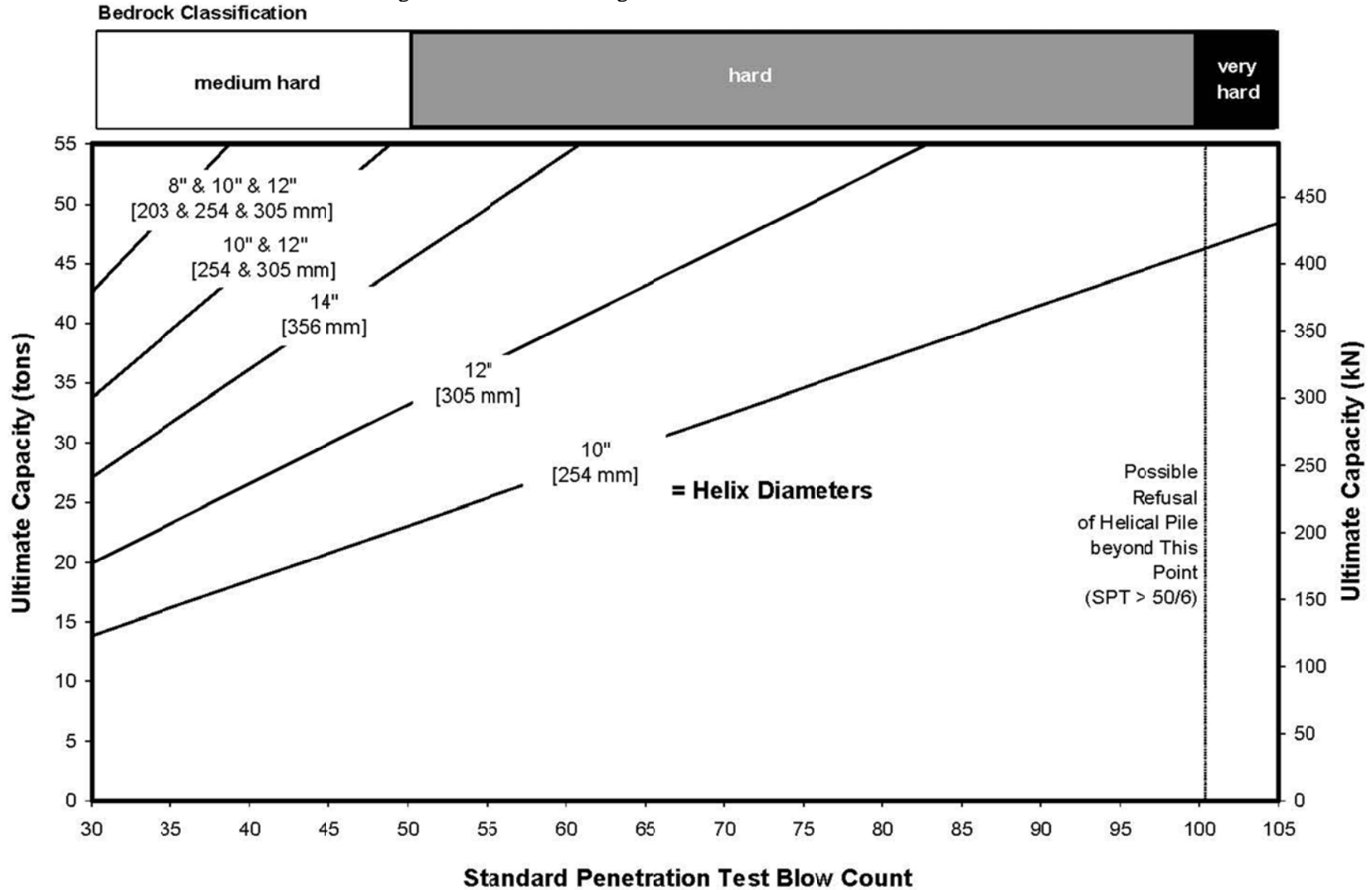
FIGURE 2 – Helical Plate Configuration Selection Diagram for Coarse Grained Soils²



² Perko, H.A., *Helical Piles – A Practical Guide to Design and Installation*, John Wiley, 2009

RAM JACK HELICAL PILE DESIGN AID

FIGURE 3 – Helical Plate Configuration Selection Diagram for Weathered Bedrock³



³ Perko, H.A., *Helical Piles – A Practical Guide to Design and Installation*, John Wiley, 2009