ENCYCLOPEDIA OF ANCHORING

B

ANCHORS AND ANCHOR TOOLS

SECTION B

www.hubbellpowersystems.com
E-mail: hpsliterature@hps.hubbell.com
Phone: 573-682-5521 Fax: 573-682-8714

Section B — Table of Contents

POWER-INSTALLED SCREW ANCHOR (PISA®) DEVELOPMENT

During 1959, after many years of engineering research and testing, Chance introduced a new system of utilizing the power of digging equipment to install screw anchors. The result was the first Chance Power Installed Screw Anchor (PISA®), the PISA® 4.

The system consists of a screw anchor, anchor rod and a special installing wrench. Each anchor has a galvanized steel threaded anchor rod with an upset hex; single or twin helices welded to a square steel hub by shielded arc electric weld, and a galvanized forged steel guy wire eye nut which is screwed to the anchor rod end.

With the anchor wrench attached to the Kelly bar or auger flight of the digger and with a locking dog arrangement holding the anchor rod in place, the PISA® anchor installs in eight to 10 minutes. The anchor may be installed with either 3½-foot rod or the standard seven-foot rod. A combination of either the 3½ or 7-foot rods may be used. Recommended maximum installing depth is 14-feet because tool recovery is difficult beyond this depth.

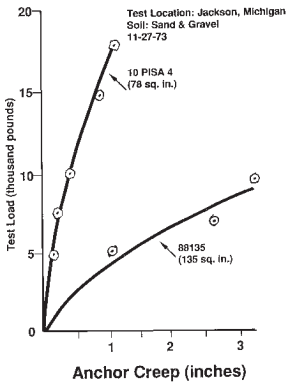
The early PISA® 4 anchor with its 1⅜-inch hub was limited to semi-plastic soils, so Chance engineers designed the PISA® 5 anchor with a 1½-inch hub for use in a greater cross-section of soils. Additional PISA® anchor designs followed, such as the PISA® 5-GT anchor and 7-GT anchor. Through Chance testing and close contact with utilities, the PISA® anchor family was expanded. Power-installed transmission anchors were introduced for high torque applications during the early 1960s. During 1980, Chance again advanced the science of anchoring by introducing 10,000 foot-pound anchor series called, "SQUARE ONE® anchors." Unlike previously introduced PISA® anchor designs, the high-strength SQUARE ONE® anchor series was driven by a wrench which slides into the hub of the anchor. The same drive wrench can be used to drive standard-strength and mid-strength series anchors. In 1990, Chance introduced the TOUGH ONE® family of 15,000 foot-pound anchors. TOUGH ONE® anchors were cast steel with no welds. The 1⅜-inch Chance installing wrench will install all Chance PISA® anchors to 10,000 foot pounds. For TOUGH ONE® anchor installations above 10,000 foot pounds, you will need the high-strength TOUGH ONE® wrench system from Chance.

Throughout the years, Chance engineers have conducted anchoring tests in conjunction with customer utilities. This has given customers a better opportunity to select the type of anchoring systems best suited to their particular needs. As a result, Chance anchors have earned an excellent reputation, making it possible for Chance to develop and improve new anchoring systems to meet the demands of utility companies throughout the world.

B

SIDE-BY-SIDE TESTS REVEAL PISA'S CLEAR SUPERIORITY

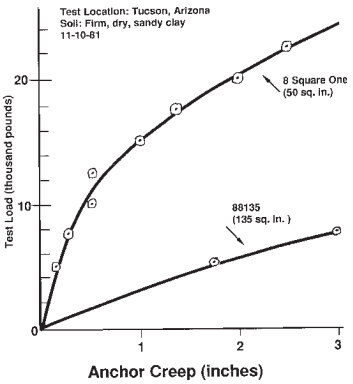
The basic reason for installing an anchor is to provide a load-attachment point at ground line, so it is important that the anchor have the necessary holding capacity. Field tests have shown that screw anchors normally hold greater loads than larger-size expanding anchors. These examples underscore this point. The graphs represent an 8-way expanding anchor and a power-installed screw anchor tested where conditions — date, soil, location, installation, and test crew, etc. — were as nearly equal as possible.



PISA® Selection Guide For Replacing Popular Expanding & Cross Plate Anchor Designs

CHANCE CAT. NO OR DESCRIPTION		CHANCE SOIL CLASS 3	4	5	6	7
		ULTIMATE ANCHOR HOLDING CAPACITY* - POUNDS				
88135	Expanding Anchor	26,500	22,000	18,500	15,000	10,000
X-16	Cross Plate Anchor	26,500	22,500	18,500	14,500	9,500
PISA® Which Will Provide Equal or Greater Holding Capacity		12" or 2-8" (1" Dia. Rod)	12" or 2-8" (¾" Dia. or Larger Rod)	12" or 2-8" (¾" Dia. or Larger Rod)	12" or 2-8" (⅝" Dia. or Larger Rod)	12" or 2-8" (⅝" Dia. or Larger Rod)

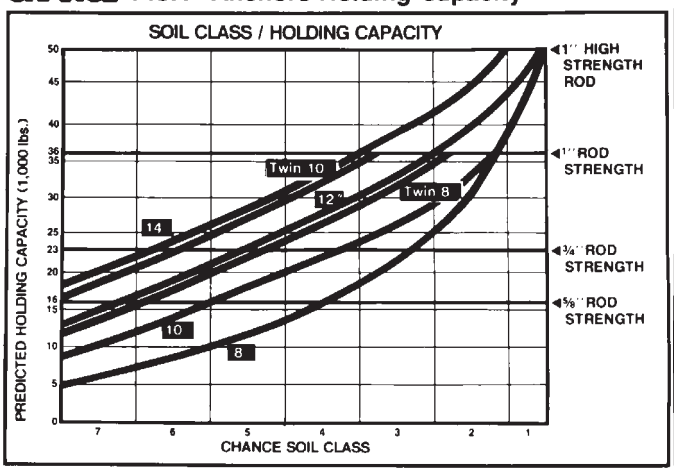
* Predicted ultimate holding capacities are based on results of extensive Chance tests and interpretation and are offered as an application guide only. They do not represent a guarantee of holding capacity in a particular soil class. User must factor in his individual, appropriate safety factor.



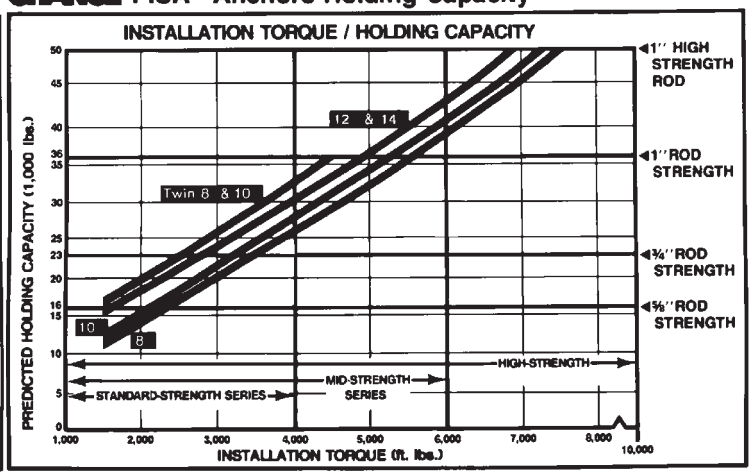
Power-Installed Screw Anchors (PISA®)

Holding Capacity/Installing Torques

CHANCE PISA® Anchors Holding Capacity



CHANCE PISA® Anchors Holding Capacity



Predicted ultimate holding capacities are based on results of extensive Chance tests and interpretation and are offered as an application guide only. They do not represent a guarantee of holding capacity in a particular soil class. A user must factor in his individual, appropriate safety factor. Torque values shown are steady values in homogenous soils, not peak values that might occur in non-homogenous soil. Torque values shown were obtained by averaging readings from the last 2 feet of anchor penetration.

CAUTION: ALL COMPONENTS OF THE CHANCE ANCHORING SYSTEM ARE PERFORMANCE MATED. USE OF OTHER ANCHORING PRODUCTS OR EQUIPMENT WILL NOT NECESSARILY PRODUCE THE SAME RESULTS.

The Science of Selecting Anchors

Soil Mechanics and Holding Capacity

During the early stages of the screw anchor, the load resistance of an installed anchor could not be predicted with reasonable accuracy. Specific information on soil conditions was lacking, making anchor selection more or less a guess. With little consideration for soil variations and the effects of seasonal weather changes or drainage, soils were classified as "sand, clay, hardpan or swamp." There wasn't any definitive explanation for such soil conditions.

Chance soil classification data opened new horizons in predicting anchor holding capacity. Initially, it was necessary to obtain soil samples from the projected anchor depth in order to classify the soil and to make anchor recommendations. However, this method was inconvenient, costly and time-consuming.

Soil Probe, A Logical Development

Chance engineers developed the "soil test probe", a mechanical tool which makes it possible to infer subsoil conditions from the surface of the earth. The soil test probe is screwed into the soil. As it displaces the soil, probe installation torque is measured in inch-pounds on a torque gauge, which is an integral part of the installing tool. Probe torque readings are then compared with the information on the Chance Soil Classification Data Chart and translated into the appropriate soil classification.

PISA®: Power-Installed Screw Anchors

More than 30 years ago, Chance introduced this system of utilizing the power of digging equipment to install screw anchors. The system consists of a screw anchor, anchor rod and a special installing wrench. Each anchor has a galvanized steel threaded anchor rod with an upset hex; single or twin helices and a galvanized guy wire nut which is screwed to the anchor rod end. PISA anchors can be installed in a matter of minutes.

Torque and Performance

Later this method was improved with the development of Chance torque indicators and sets of holding capacity values for given anchor types. This did not obviate the soil classification data but strengthened and simplified it so the utility employee could install a PISA® anchor or other Chance anchor to a given torque value and predict with relative accuracy the holding capacity of the installed anchor. Actually, the correlation between installing torque and anchor performance required thousands of tests throughout the United States and in every conceivable soil condition. It is much labor, engineering research and investment that have made possible the development of this reliable and predictable anchoring philosophy.

Torque Ratings

Chance screw anchors are designed and manufactured for maximum torsional strength. During installation, some of the torque applied by the digger and measured by installation torque indicators is dissipated by friction along the wrench and not applied to the anchor itself, so it is possible to apply more torque than the anchor alone can withstand. Chance anchors are rated by maximum working torque or, for the more recent designs, by the 5 per cent exclusion limit which is a more explicitly defined criterion based on statistical analysis of on-line quality control testing. Both ratings take into consideration the variation to be expected in anchor torsional strength due to normal variations in materials and manufacturing processes. Customers should consider this variation along with the wide variation that can be seen in the frictional loss along the wrench in deciding how much torque can be applied safely during installation. The fact that Chance ratings are set near the minimum credible torsional strength also should be considered in comparing Chance ratings to those of manufacturers who rate their anchors based on average strength.

Anchor Application Information

SOIL CLASSIFICATION DATA

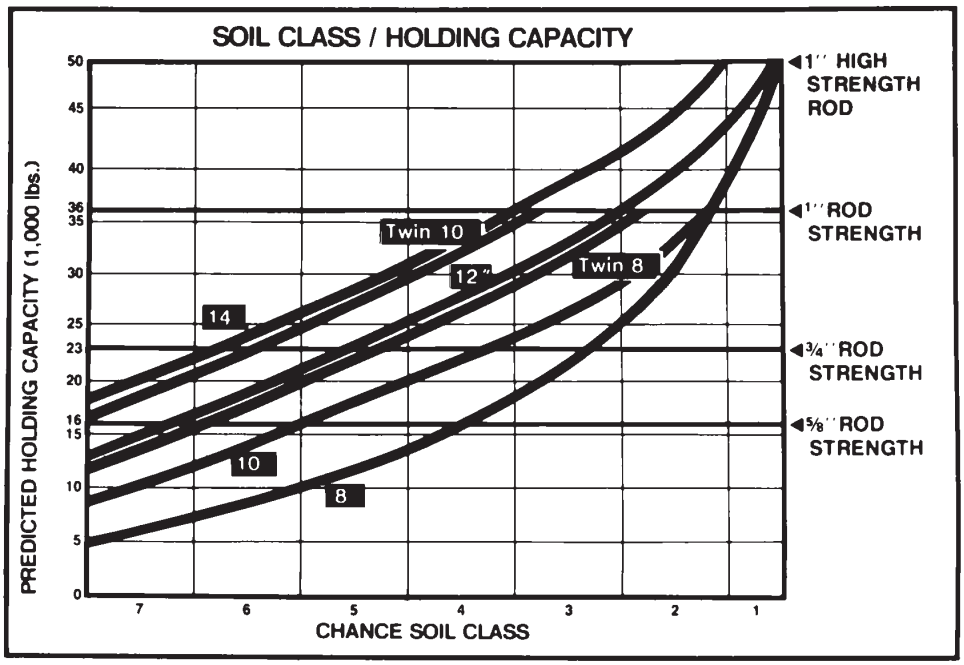
Class	Common Soil-Type Description	Geological Soil Classification	Probe Values in.-lb. (NM)	Typical Blow Count "N" per ASTM-D1586
0	Sound hard rock, unweathered	Granite, Basalt, Massive Limestone	N.A.	N.A.
1	Very dense and/or cemented sands; coarse gravel and cobbles	Caliche, (Nitrate-bearing gravel/rock),	750 - 1600 (85 - 181)	60-100+
2	Dense fine sands; very hard silts and clays (may be preloaded)	Basal till; boulder clay; caliche; weathered laminated rock	600-750 (68 - 85)	45-60
3	Dense sands and gravel; hard silts and clays	Glacial till; weathered shales, schist, gneiss and siltstone	500 - 600 56 - 68	35-50
4	Medium dense sand and gravel; very stiff to hard silts and clays	Glacial till; hardpan; marls	400 - 500 (45 - 56)	24-40
5	Medium dense coarse sands and sandy gravels; stiff to very stiff silts and clays	Saprolites, residual soils	300 - 400 (34 - 45)	14-25
6	Loose to medium dense fine to coarse sands to stiff clays and silts	Dense hydraulic fill; compacted fill; residual soils	200 - 300 (23 - 34)	7-14
**7	Loose fine sands; Alluvium; loess; medium - stiff and varied clays; fill	Flood plain soils; lake clays; adobe; gumbo, fill	100 - 200 (11 - 23)	4-8
**8	Peat, organic silts; inundated silts, fly ash very loose sands, very soft to soft clays	Miscellaneous fill, swamp marsh	less than 100 (0 - 11)	0-5

Class 1 soils are difficult to probe consistently and the ASTM blow count may be of questionable value.
**It is advisable to install anchors deep enough, by the use of extensions, to penetrate a Class 5 or 6, underlying the Class 7 or 8 Soils.

POWER-INSTALLED SCREW ANCHORS (PISA®)

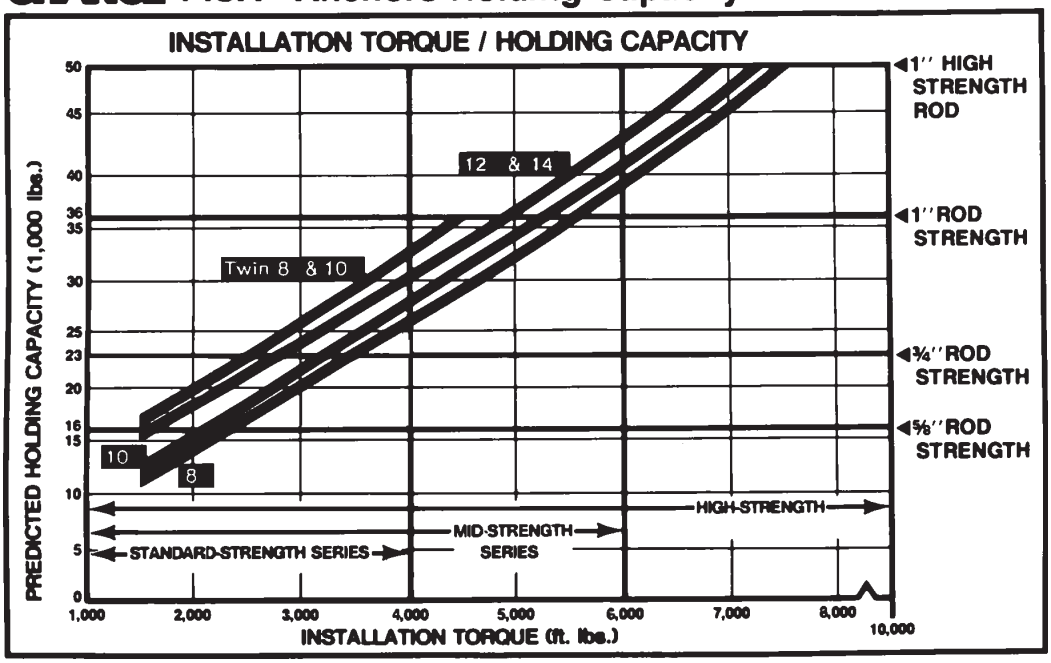
Holding Capacity/Installing Torques

CHANCE PISA® Anchors Holding Capacity



Under no circumstance should the rod and guy strand join at an angle of departure exceeding ± 5° on PISA anchors.

CHANCE PISA® Anchors Holding Capacity



Predicted ultimate holding capacities are based on results of extensive Chance tests and interpretation and are offered as an application guide only. They do not represent a guarantee of holding capacity in a particular soil class. A user must factor in his individual, appropriate safety factor. Torque values shown are steady values in homogenous soils, not peak values that might occur in non-homogenous soil. Torque values shown were obtained by averaging readings from the last 2 feet of anchor penetration. The anchor shaft must be aligned with the guy load to prevent premature failure of the rod. **Under no circumstance should the rod and guy strand join at an angle of departure exceeding ± 5° on PISA anchors.**

CAUTION: ALL COMPONENTS OF THE CHANCE ANCHORING SYSTEM ARE PERFORMANCE MATED. USE OF OTHER ANCHORING PRODUCTS OR EQUIPMENT WILL NOT NECESSARILY PRODUCE THE SAME RESULTS.

B

TOUGH ONE® ANCHOR HELIX ASSEMBLIES

TORQUE RATINGS: 10,000 FT.-LB., AND 8,000 FT.- LB.

Small Hub (2¼" Square Inside)

The C10252-- series of TOUGH ONE® anchors have a smaller inside hub diameter than our C10250-- series. The smaller hub is designed to be installed with the Chance anchor wrench C1021583.

TOUGH ONE® anchors give users high-strength anchor capability in all soils. You get a better anchor at an economical price.

The anchor's sloped lead point improves penetration and helps soil flow from below the hub to above the anchor.

TOUGH ONE® anchors use standard PISA® rods (see page B-12).

Use 8,000 ft.-lb. TOUGH ONE® anchor in soft and medium-hard soils

Use high-strength 10,000 ft-lb. TOUGH ONE® anchor in hard soils .

Ordering Information

8,000 ft.-lb. TOUGH ONE® anchor 2¼" Square Inside Hub

Install with the Chance STANDARD (10,000 ft.-lb.) wrench (see page B-29).

	8" Dia.	Std. Pkg./ Pallet	10" dia.	Std. Pkg./ Pallet
For ⅝" dia. Rod	C1025208	4/96	C1025209	4/96
For ¾" & 1" dia. Rods	C1025204	4/96	C1025205	4/96
	12" Dia.	**Std. Pkg./ Pallet**	**14" dia.**	**Std. Pkg./ Pallet**
For ¾" & 1" dia. Rods	C1025206	2/48	C1025207	2/40
For ⅝" dia. Rods	C1025210	2/48		

10,000 ft.-lb. TOUGH ONE® anchor 2¼" Square Inside Hub

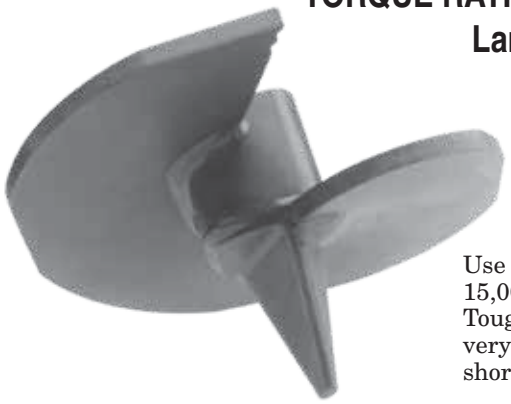
Install with the Chance STANDARD (10,000 ft.-lb.) wrench (see page B-29).

	8" Dia.	Std. Pkg./ Pallet	10" dia.	Std. Pkg./ Pallet
For ¾" & 1" dia. Rods	C1025200	4/96	C1025201	4/96
	12" Dia.	**Std. Pkg./ Pallet**	**14" dia.**	**Std. Pkg./ Pallet**
	C1025202	2/48	C1025203	2/40

TOUGH ONE® ANCHOR HELIX ASSEMBLIES

TORQUE RATINGS: 15,000 FT.-LB., AND 8,000 FT.- LB.

Large Hub (2½" Square Inside)



Use high-strength 15,000 ft-lb. Tough One in very hard soils short of solid rock.

Use 8,000 ft.-lb. TOUGH ONE® anchor in soft and medium-hard soils.

TOUGH ONE® anchors give users high-strength anchor capability in all soils. You get a better anchor at an economical price. With TOUGH ONE® anchors, there's little concern about anchor breakage when encountering hard soils.

The anchor's sloped lead point improves penetration and helps soil flow from below the hub to above the anchor.

TOUGH ONE® anchors use standard PISA® rods (see page 4-10).

It's easy to upgrade your entire program with TOUGH ONE® anchors.

If soil conditions require installations above 10,000 ft.-lbs., you will need our TOUGH ONE® wrench system consisting of drive-end assembly, Kelly bar adapter and locking dog assembly. The high-strength system will also install PISA® 6 and 7 anchors. See page B-31 for high-strength anchor installing wrench information.

B

Ordering Information

8,000 ft.-lb. TOUGH ONE® anchor

2½" Square Inside Hub

Install with the Chance HYBRID* or TOUGH ONE® wrench (see page B-29 or B-31)

	8" Dia.	Std. Pkg./ Pallet	10" Dia.	Std. Pkg./ Pallet
For ⅝" dia. Rod	C1025008	4/96	C1025009	4/96
For ¾" & 1" Dia. Rods	C1025004	4/96	C1025005	4/96
	12" Dia.	**Std. Pkg./ Pallet**	**14" Dia.**	**Std. Pkg./ Pallet**
For ⅝" dia. Rod	C1025010	2/48		
For ¾" & 1" dia. Rods	C1025006	2/48	C1025007	2/40

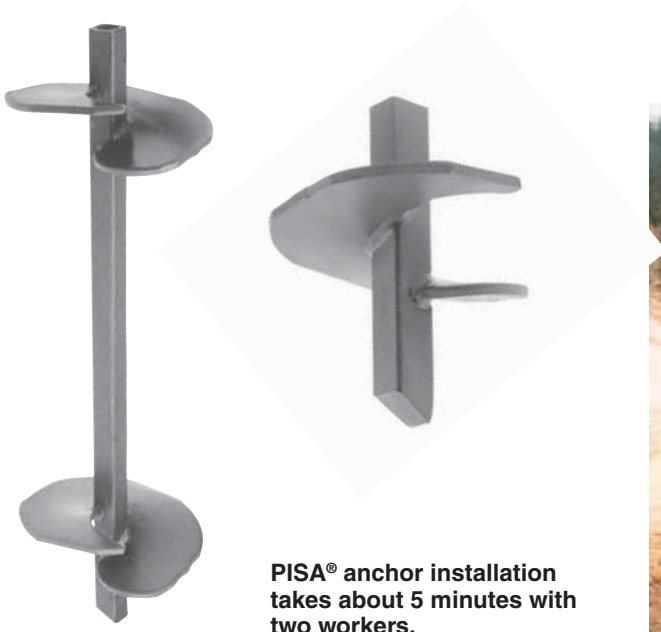
15,000 ft.-lb. TOUGH ONE® anchor

2½" Square Inside Hub

Install with only the Chance TOUGH ONE® wrench system (Catalog page B-31)

	8" Dia.	Std. Pkg./ Pallet	10" Dia.	Std. Pkg./ Pallet
For ¾" & 1" dia. Rods	C1025000	4/96	C1025001	3/72
	12" Dia.	**Std. Pkg./ Pallet**	**14" Dia.**	**Std. Pkg./ Pallet**
	C1025002	2/48	C1025003	2/40

PISA® ANCHOR HELIX ASSEMBLIES



PISA® anchor installation takes about 5 minutes with two workers.

Chance Standard-Strength 4,000 foot-pound anchors and Mid-Strength 6,000 foot-pound anchors have curvilinear leading edges to help penetrate rocky soils and to reduce damage during installation. These anchors are available in single and twin-helix designs. The same installing wrench installs Standard and Mid-Strength anchors as well as TOUGH ONE® C10252- - series anchors. See page 4A-4 for installing wrench information.

B

Ordering Information

STANDARD-STRENGTH ANCHOR SERIES

1⅜" CORE — 4000 ft.-lbs. Typical Working Torque — Squared Helix — 3.0" Helix Pitch

SINGLE HELIX	Catalog Number							
	8" Dia.	Std. Pkg.	10" Dia.	Std. Pkg.	12" Dia.	Std. Pkg.	14" Dia.	Std. Pkg.
For ⅝" Dia. Rods	024474	8/240	024476	4/96	024462*	4/80	NA	—
For ¾" & 1" Dia. Rods	024475	8/240	024478	4/96	024481	4/80	P024484*	2/32

*RUS Accepted

TWIN HELIX	Catalog Number			
	8" Dia.	Std. Pkg.	10" Dia.	Std. Pkg.
For ¾" & 1" Dia. Rods	012904	1/30	012905	1/30

MID-STRENGTH ANCHOR SERIES

1⅜" CORE — 6000 ft.-lbs. Typical Working Torque — Squared Helix — 3.0" Helix Pitch

SINGLE HELIX	Catalog Number							
	8" Dia.	Std. Pkg.	10" Dia.	Std. Pkg.	12" Dia.	Std. Pkg.	14" Dia.	Std. Pkg.
For ⅝" Dia. Rods	E1021629	8/240	E1021630	4/96	E1021631	4/80	NA	—
For ¾" & 1" Dia. Rods	E1021632	8/240	E1021633	4/96	E1021634	4/80	E1021801	2/32

TWIN HELIX	Catalog Number					
	4" Dia.	Std. Pkg.	8" Dia.	Std. Pkg.	10" Dia.	Std. Pkg.
For ¾" & 1" Dia. Rods	E1021635	1/30	E1021636	1/30	E1021637	1/30

See Page B-12 for ordering PISA anchor rods and eyenuts.

PISA® 6 and PISA® 7 ANCHOR HELIX ASSEMBLIES

Chance PISA®-6 6000 foot-pound anchors and PISA®-7 7000 foot-pound anchors have curvilinear leading edges to help penetrate rocky soils and to reduce damage during installation. These anchors are available in single and twin-helix designs.

PISA®-6 and PISA®-7 anchors have a 1½" square solid core for added strength. See page 4A-4 or 4A-6 for information on the 1½" installing wrench.

ORDERING INFORMATION

PISA® 6 anchor

1½" CORE — 6000 ft.-lbs. Typical Working Torque — Squared Helix — 3.0" Helix Pitch

SINGLE HELIX	Catalog Number							
	8" Dia.	Std. Pkg./Pallet	10" Dia.	Std. Pkg./Pallet	12" Dia.	Std. Pkg./Pallet	14" Dia.	Std. Pkg./Pallet
For ⅝" Dia. Rods	E1020816	8/240	E1020817	4/96	—	—	—	—
For ¾" & 1" Dia. Rods	E1020819	8/240	E1020820	4/96	E1020821	4/80	T1022142	2/32

TWIN HELIX	Catalog Number			
	Two 8" Dia.	Std. Pkg./Pallet	Two 10" Dia.	Std. Pkg./Pallet
For ¾" & 1" Dia. Rods	E1020822	1/30	E1020823	1/30

PISA® 7 anchor

1½" CORE — 7000 ft.-lbs. Typical Working Torque — Squared Helix — 3.0" Helix Pitch

SINGLE HELIX	Catalog Number			
	8" Dia.	Std. Pkg./Pallet	10" Dia.	Std. Pkg./Pallet
For ¾" & 1" Dia. Rods	E1021223	8/240	E1020250	4/96

TWIN HELIX	Catalog Number					
	Two 8" Dia.	Std. Pkg./Pallet	Two 10" Dia.	Std. Pkg./Pallet	Two 4" Dia.	Std. Pkg./Pallet
For ¾" & 1" Dia. Rods	E1021219	1/30	E1021220	1/30	V1021428	1/30

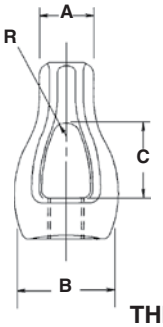
See Page B-12 for ordering PISA anchor rods and eyenuts.

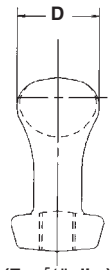
PISA® ANCHOR RODS, EYENUTS AND COUPLINGS

All components shown on this page are hot-dip galvanized per ASTM A153.

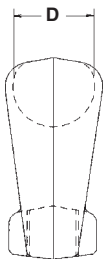



EYENUT	Catalog Number					
	Thimbleye®	Std. Pkg./Pallet	Twineye®	Std. Pkg./Pallet	Tripleye®	Std. Pkg./Pallet
For 5/8" Dia. Rods	12587*	30/2250	12589	30/975	12593	30/750
For 3/4" & 1" Dia. Rods	6512*	30/1200	6562	30/1200	12585	30/1200
For 1" Dia. H.S.	N/A	N/A	6562H	25/1000	12585H	25/1000



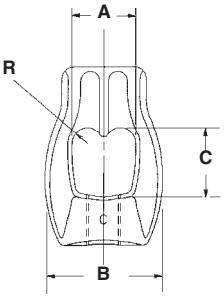


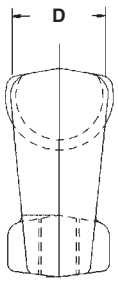
(For 5/8" dia.)



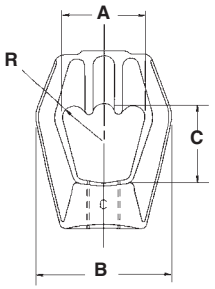
(For 3/4" & 1 dia.)

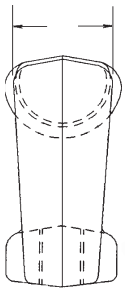
THIMBLEYE® NUTS





TWINEYE® NUTS





TRIPLEYE® NUTS

	A	B	C	D	R
For 5/8" Dia. Rods	7/8"	1 7/8"	1 3/8"	1 11/64"	1/4"
For 3/4" & 1 Dia. Rods	1 1/8"	2 25/64"	1 19/32"	1 5/8"	13/32"

	A	B	C	D	R
For 5/8", 3/4"& 1 Dia. Rods	1 13/32"	2 25/64"	1 27/64"	1 1/2"	5/16"

	A	B	C	D	R
For 5/8", 3/4"& 1 Dia. Rods	1 3/4"	2 13/16"	1 5/8"	1 1/2"	1/4"

ROD	3½-ft. ROD		7-ft. ROD		Ultimate
	Cat. No.	Std. Pkg./Pallet	Cat. No.	Std. Pkg./Pallet	Strength†
5/8" Dia.	12336P	5/50	12332P*	5/50	16,000 lbs.
3/4" Dia.	12634P	5/50	12632P*	5/50	23,000 lbs.
1" Dia.	12338P	5/50	12334P	2/50	36,000 lbs.
1" Dia. H.S.	C1021987	5/60	C1021986	2/50	50,000 lbs.

*RUS Accepted. †Ultimate strength ratings apply to properly installed anchors only.
Failure to install within 5° of alignment with the guy load will significantly lower strength.

COUPLING	Catalog Number	Std. Pkg./Pallet
For 5/8" Dia. Rods	12245P	60/1950
For 3/4" & 1" Dia. Rods	12247P	50/2400

NOTE: Couplings are required only when it is necessary to add additional rods of 3½ ft. or 7 ft. to form an extension.

Extension Rod & Coupling Combinations	3½ ft. ROD	
	Cat. No.	Std. Pkg./Pallet
5/8" Dia.	12249A	5/50
3/4" Dia.	12250A	5/50
1" Dia.	12251A	5/50

PISA® Rod & Eyenut Combinations

Catalog No.	Rod, Eyenut
E1020031	5/8" x 3½' Rod & Thimbleye Nut
E1020047	5/8" x 3½' Rod & Tripleye Nut
E1020035	5/8" x 7' Rod & Thimbleye Nut
E1020043	5/8" x 7' Rod & Twineye Nut
E1020051	5/8" x 7' Rod & Tripleye Nut
E1020032	3/4" x 3½' Rod & Thimbleye Nut
E1020040	3/4" x 3½' Rod & Twineye Nut
E1020036	3/4" x 7' Rod & Thimbleye Nut
E1020044	3/4" x 7' Rod & Twineye Nut
E1020052	3/4" x 7' Rod & Tripleye Nut
E1020041	1" x 3½' Rod & Twineye Nut
E1020049	1" x 3½' Rod & Tripleye Nut
E1020037	1" x 7' Rod & Thimbleye Nut
E1020045	1" x 7' Rod & Twineye Nut
E1020053	1" x 7' Rod & Tripleye Nut

Corrosion-Protected PISA® Rod & Coupling

Rod is asphalt-coated galvanized with heat-shrink and plastic tube covering. Coupling is galvanized, covered with heat-shrink tubing.


Rod Cat. No.	Fits Rod Size	Std. Pkg./ Pallet
C1021996	1" x 7"	2/50
C1022061	1" x 3½'	5/50
Coupling C1025240	1"	50/2400

RR (ROUND-ROD) SCREW ANCHORS

The Round-Rod "RR" multi-helix anchors are used in areas where weak soil conditions exist and moderate holding capacities are required. All helix lead sections are 7 ft. long. Extension shafts may be required for installation to proper depth.

RR screw anchors consist of three galvanized components: Lead section, extension shaft (which includes an integral coupling), and the guy adapter. Each extension and guy adapter includes a high-strength bolt and nut.

Type RR (Round-Rod) anchors torque rating is 2,300 ft-lb. Ultimate tension rating for RR mechanical strength is 70,000 lb. Failure to install within 5° of alignment with the guy load will significantly lower strength.

LEAD SECTIONS

Catalog No.	Length	Helix Combinations	Std. Pkg./Pallet	Holding Capacity - (lb.) vs. Soil Class		
				Class 7	Class 6	Class 5
012690AE	7 ft.	8" - 10"	1/20	19,000	23,000	27,000
012690AEJ	7 ft.	8" - 10" - 12"	1/20	26,000	32,000	39,000
V1090007	7 ft.	10" - 10" - 10"	1/15	25,000	31,000	N/A
V1090006	7 ft.	10"	1/20	17,000	21,000	24,000

EXTENSIONS

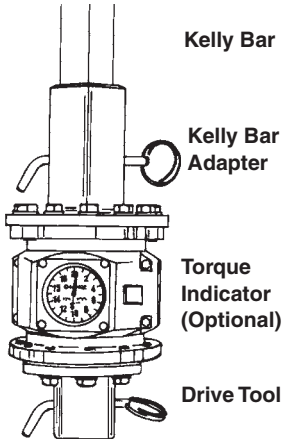
Catalog No.	Nominal length	Std. Pkg./Pallet
12696	3½ ft.	1/50
12697	5 ft.	1/50
12698	7 ft.	1/30
12699	10 ft.	1/50

Extensions with helices are available. Contact your Hubbell representative or ServiCenter for information.

GUY ADAPTERS

Catalog No.	Nominal length	Description	Std. Pkg./Pallet
C1020023	18"	Thimbleye®	5/175
C1020024	18"	Twineye®	5/250
C1020025	18"	Tripleye®	5/250
C1100026	20"	Threaded Stud	5/130
C1100041	18"	Ovaleye	5/200

TYPICAL "RR" DRIVE STRING



For installation tool options, see page B-30.

Guy Adapter

Extension

Lead Section

LOAD CAPACITY[1] BASED ON INSTALLATION TORQUE[2]
LOAD CAPACITY OF RR ANCHORS IN SOIL (POUNDS TENSION)

Helix Combinations	Installation Torque (ft-lb)		
	1,500	2,000	2,300
10"	16,000	22,000	28,000
8" - 10"	17,000	23,000	29,000
10" - 10" - 10"	19,000	25,000	31,000
8" - 10" - 12"	19,000	25,000	31,000

[1]Load capacities listed above are ultimate values based on average test data and are offered as an application guide. Typical deflection at ultimate load ranges between 2 and 4 inches. The listed values should be reduced by an appropriate factor of safety. More specific data on soils and anchor performance in any site condition can be obtained by contacting Hubbell Power Systems.

[2]The torque values shown are steady values in homogeneous soils, not peak values that can occur in non-homogeneous soils such as glacial till or other rocky soils. The torque values shown are obtained by averaging the readings from the last 2 feet of anchor penetration.

SS (SQUARE-SHAFT) SCREW ANCHORS

Square-Shaft "SS" multi-helix screw anchors are designed for heavy-guy loading. They have 1½" square steel shafts. Extension shafts must be coupled to the helix section for installation to the proper depth. For installation tool options, see catalog Section 4A.

SS screw anchors consist of three galvanized components: the lead section, the extension shaft, which includes an integral coupling, and the guy adapter. Extensions and guy adapters include a high-strength bolt and nut.

Typical working torque is 5,500 ft.-lb. and minimum ultimate tension strength is 70,000 lb. Note: Ultimate strength ratings apply to properly installed anchors only. Failure to install within 5° of alignment with the guy load will significantly lower strength.

LEAD SECTIONS†

Catalog No.	Length	Helix Combinations	Std. Pkg./ Pallet	Holding Capacity - (lb.) vs. Soil Class					
				Class 7	Class 6	Class 5	Class 4	Class 3	Class 2
012642AE*	3 ft.	8" - 10"	1/20	19,000	23,000	27,000	32,000	36,000	41,000
012642EJ	3½ ft.	10" - 12"	1/20	21,000	26,000	31,000	36,000	41,000	46,000
012642AEJ*	5½ ft.	8" - 10" - 12"	1/20	26,000	32,000	39,000	46,000	51,000	58,000
012642EJN*	7 ft.	10" - 12" - 14"	1/20	29,000	37,000	45,000	53,000	61,000	69,000
012642AEJN	10½ ft.	8" - 10" - 12" - 14"	1/20	31,000	40,000	49,000	58,000	67,000	N/A
012642EJNS*	10½ ft.	10" - 12" - 14" - 14"	1/20	40,000	51,000	62,000	70,000	N/A	N/A

Note: Holding capacites are based on average test data and are offered as an application guide only.
*RUS Accepted. †Packaging note: Lead sections are banded to wood blocks to facilitate forklift handling.

EXTENSIONS‡

Catalog No.	Nominal Length	Helix Diameter	Std. Pkg./Pallet
12655	3½ ft.	N/A	1/50
12656	5 ft.	N/A	1/50
12657	7 ft.	N/A	1/40
12658	10 ft.	N/A	1/50
12656N	5 ft.	14"	1/12
12655J	3½ ft.	12"	1/12

‡Packaging note: Extension shafts are banded to wood blocks to facilitate forklift handling.

GUY ADAPTERS‡‡

Catalog No.	Nominal Length	Description	Std. Pkg./Pallet
C1020023	18"	Thimbleye®	5/175
C1020024	18"	Twineye®	5/250
C1020025	18"	Tripleye®	5/250
C1100026	20"	Threaded Stud	5/130
C1100041	18"	Ovaleye	5/200

‡‡Packaging note: Guy adapters are shipped in corrugated cartons.

LEAD SECTION & GUY ADAPTER COMBINATIONS*

Catalog No.	Guy Adapter	Helix Combinations
126541AE	Thimbleye®	8" - 10"
126541EJ	Thimbleye®	10" - 12"
126541AEJ	Thimbleye®	8" - 10" - 12"
126541EJN	Thimbleye®	10" - 12" - 14"
126541EJNS	Thimbleye®	10" - 12" - 14" - 14"
126542AE	Twineye®	8" - 10"
126542EJ	Twineye®	10" - 12"
126542AEJ	Twineye®	8" - 10" - 12"
126542EJN	Twineye®	10" - 12" - 14"
126542EJNS	Twineye®	10" - 12" - 14" - 14"
126543AE	Tripleye®	8" - 10"
126543EJ	Tripleye®	10" - 12"
126543AEJ	Tripleye®	8" - 10" - 12"
126543EJN	Tripleye®	10" - 12" - 14"
126543EJNS	Tripleye®	10" - 12" - 14" - 14"

*Packaging note: Lead sections are banded to wood blocks to facilitate forklift handling. Guy adapters are shipped in separate corrugated cartons.

Guy Adapter

Extension

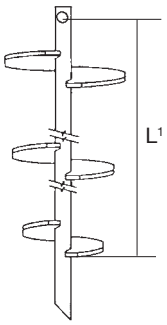
Lead Section

LOAD CAPACITY[1] BASED ON INSTALLATION TORQUE[2]
LOAD CAPACITY OF SS ANCHORS IN SOIL (POUNDS TENSION)

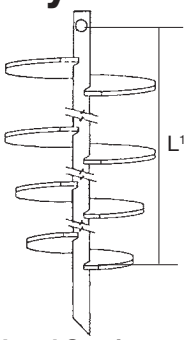
Helix Combinations	Installation Torque (ft-lb)								
	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500
8" - 10"	17,000	23,000	29,000	34,000	40,000	46,000	52,000	58,000	63,000
10" - 12"	18,000	24,000	30,000	36,000	42,000	48,000	54,000	60,000	66,000
8" - 10" - 12"	19,000	25,000	31,000	38,000	44,000	50,000	56,000	62,000	68,000
10" - 12" - 14"	20,000	26,000	32,000	39,000	46,000	52,000	58,000	65,000	70,000
8" - 10" - 12" - 14"	20,000	27,000	34,000	40,000	47,000	54,000	61,000	68,000	70,000
10" - 12" - 14" - 14"	21,000	28,000	35,000	42,000	49,000	56,000	63,000	70,000	70,000

[1]Load capacities listed above are ultimate values based on average test data and are offered as an application guide. Typical deflection at ultimate load ranges between 2 and 4 inches. The listed values should be reduced by an appropriate factor of safety. More specific data on soils and anchor performance in any site condition can be obtained by contacting Hubbell Power Systems.
[2]The torque values shown are steady values in homogeneous soils, not peak values that can occur in non-homogeneous soils such as glacial till or other rocky soils. The torque values shown are obtained by averaging the readings from the last 2 feet of anchor penetration.

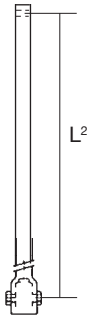
HIGH-STRENGTH SS ANCHORS for Heavy Tension Loading



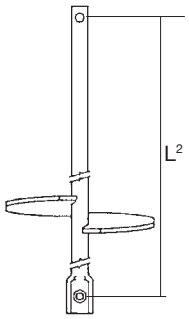
Lead Section



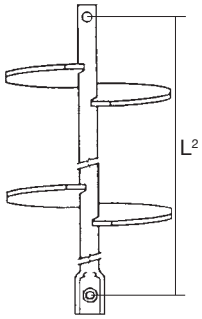
Lead Section



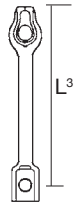
Plain Extension

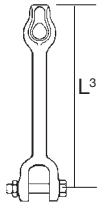


Single Helix Extension

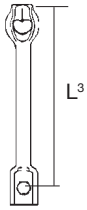


Two Helix Extension

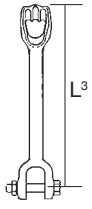




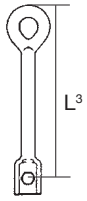
Socket THIMBLEYE® Adapter *Clevis



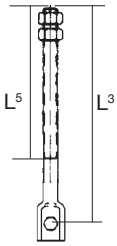
Socket TWINEYE® Adapter

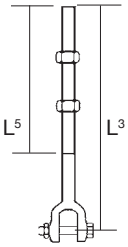


Socket TRIPLEYE® Adapter *Clevis

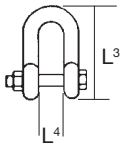


Ovaleye Adapter

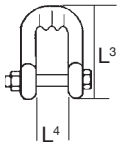




Socket Threaded Adapter *Clevis



Chain Shackle



TRIPLEYE® Chain Shackle

B

RATINGS

ORDERING INFORMATION

Mechanical Properties	SS 150 1.50" Square Shaft	SS 175 1.75" Square Shaft	SS 200 2.00" Square Shaft	SS 225 2.25" Square Shaft
Max. Installation Torque	7,000 ft.-lb.	11,000 ft.-lb.	15,000 ft.-lb.	20,000 ft.-lb.
Min. Ultimate Tension Strength	70,000 lb.	100,000 lb.	150,000 lb.	200,000 lb.

LEAD SECTIONS

Helix Configuration	SS 150			SS 175			SS 200			SS 225		
	Galv.	Non-Galv.	L^1	Galv.	Non-Galv.	L^1	Galv.	Non-Galv.	L^1	Galv.	Non-Galv.	L^1
8" & 10"	C1100385	C1140014	30"	C1100227	C1140020	30"						
6", 8" & 10"							C1100569	C1140214	60"	C1100543	C1140187	54"
8", 10" & 12"	C1100386	C1140015	57"	C1100235	C1140021	60"	C1100570	C1140215	60"	C1100544	C1140188	75"
14", 14" & 14"	C1100504	C1140149	120"	C1100505	C1140084	124"	C1100572	C1140216	122"	C1100545	C1140190	114"
8", 10", 12" & 14"		C1140100	120"	C1100247	C1140101	124"	C1100573	C1140217	122"	C1140189	C1140189	115"

EXTENSIONS

Helix Configuration	SS 150			SS 175			SS 200			SS 225		
	Galv.	Non-Galv.	L^2	Galv.	Non-Galv.	L^2	Galv.	Non-Galv.	L^2	Galv.	Non-Galv.	L^2
None	C1100388	C1140016	37"	C1100136	C1140022	37"	C1100563	C1140209	37"	C1100645	C1140243	40"
None	C1100470	C1140104	59"	C1100137	C1140105	59"	C1100564	C1140210	58"	C1100646	C1140244	60"
None	C1100389	C1140017	80"	C1100138	C1140023	80"	C1100565	C1140211	80"	C1100647	C1140245	80"
None	C1100440	C1140080	122"	C1100140	C1140081	124"	C1100566	C1140212	123"			120"
Single 14" helix	C1100471	C1140108	48"	C1100472	C1140109	48"	C1100577	C1140220	45"	C1100650	C1140238	39"
Twin 14" helices	C1100454	C1140058	80"	C1100450	C1140057	80"	C1100581	C1140224	80"	C1100652	C1140252	78"
Triple 14" helices	C1100475	C1140112	123"	C1100476	C1140113	124"	C1100586	C1140231	123"			120"

TERMINATION ADAPTERS

	SS 150			SS 175			SS 200			SS 225		
	Galv.	Non-Galv.	L^3	Galv.	Non-Galv.	L^3	Galv.	Non-Galv.	L^3	Galv.	Non-Galv.	L^3
Thimpleye Adapter	C1020023		17"	*T1100311		17"			17"			
Twineye Adapter	C1020024		17"									
Tripleye Adapter	C1020025		17"	*T1100465		17"						
Ovaleye Adapter	C1100041		17"									
Threaded Adapter	C1100026	L^5=13½	20"	*T1100352*	L^5=36"	48"						
Chain Shackle	†C1100574	L^4=1½	5⅛"	T1100134	L^5=1 13⁄16	6⅝"	C1100557	L^4=2¼"	8¼"	C1100558	L^4=2⅜"	9"

*T1100352 includes two nuts.
†TRIPLEYE® shackle

*Clevis fitting. Others have Socket fitting.

Industry Standards

based on CHANCE® multi-helix anchor specs

State-of-the-Art:

R&D history of inter-helix spacing traces application of technical principles

The helical screw anchor is not a sophisticated product in the 21st century of cell phones, the Internet and High-Definition TV. A low-tech product in a high-tech world, it continues to serve ever-expanding roles for utilities and in civil construction. In fact, the screw anchor's elegant simplicity is its greatest asset: An uncomplicated product with multiple uses.

Historical Perspective: Low-tech to high-tech designs

Helical screw anchors may be simple in concept, but they come in many forms. Take out your copy of the CHANCE® *Encyclopedia of Anchoring* and look through the Anchor Product Section. It shows you these types: PISA® (Power Installed Screw Anchors), Tough One®, Square-Shaft (or SS), Round-Rod (or RR), and No-Wrench screw anchors. If you also have an Chance Civil Construction SA Catalog, you can find Types HS, T/C, Street Light Foundations (SLF), Area Lighting Foundations (ALF), and HELICAL PULLDOWN™ Micropiles (HPM). These anchor types all have three things in common:

1. At least one helically shaped bearing plate,
2. A central steel shaft,
3. An appropriate structural connection at the top.

Yet each different anchor type serves different applications. And new uses seemingly come to light every day.

Answers to FAQs (Frequently Asked Questions):

This array of screw anchor types has led many to ask why so many? What requirements or design constraints have led to their current forms? Can the current design be improved?
In the case of multi-helix screw anchors, particularly Type SS, how far apart should the helix plates be spaced along the shaft?
Is there an optimum spacing that provides the best performance in terms of installation and load carrying capacity? Answering these questions requires looking back over some 40 years to just before Chance developed Type SS screw anchors.

Introduced in 1959, PISA anchors were well known and in widespread use by the early 1960's. They were available in single and twin-helix configurations (twin 8" and twin 10"). Their inter-helix spacing changed often over the years, but always has been in the 15- to 30-inch range. Their standard rod length was 7 ft. As the following quote from the 1966 edition of the *Encyclopedia of Anchoring* indicates, the chief advantage of multi-helix anchors was already known: *"Installed in place of larger single helix Type PISA. Higher holding powers can be obtained with the two helix anchors."*

Where two helices are better than one, logic indicates three or more helices would be better than two. This reasoning was put to good use in 1961, when Chance developed extendable Type RR multi-helix anchors. The original application for multi-helix RR anchors was as tiedowns for underground pipelines in poor soil conditions along coastal regions of the Gulf of Mexico. Type RR anchors worked well

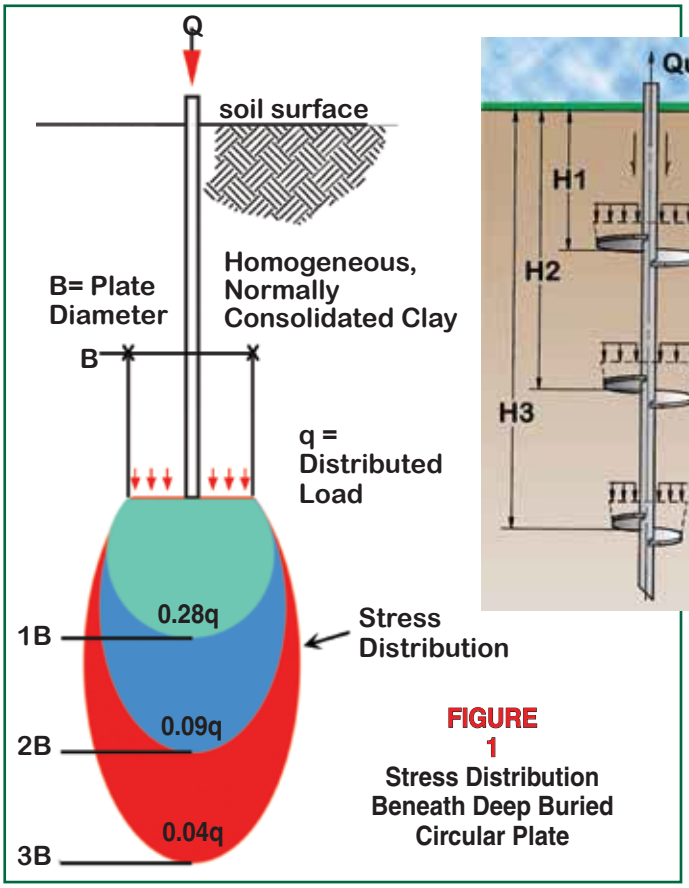


FIGURE 1 Stress Distribution Beneath Deep Buried Circular Plate

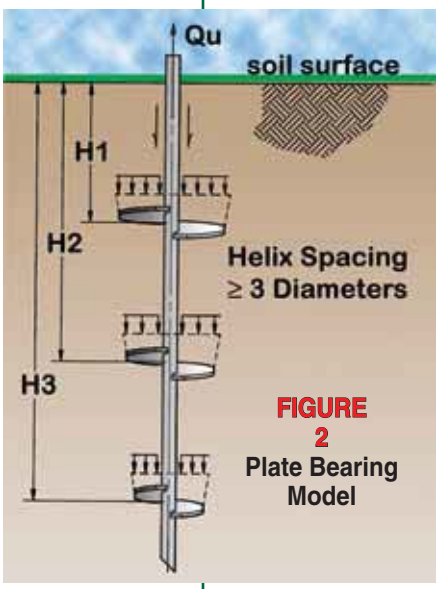


FIGURE 2 Plate Bearing Model

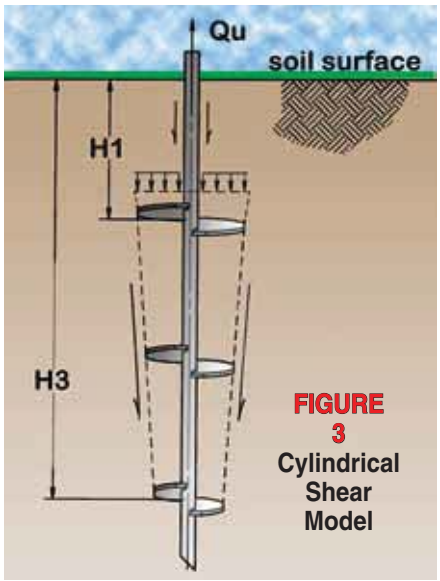


FIGURE 3 Cylindrical Shear Model

in weak surficial soils, but their 1¼" diameter shaft did not provide enough torque strength to penetrate very far into firm bearing soils.

Development of a high torque multi-helix anchor began in 1963, culminating in Chance's introduction of Type SS 1½" square shaft multi-helix anchors in 1964-65.

Inter-helix spacing was 36" for both Types RR and SS anchors. Why 36 inches? Remember that the 7-ft. length of standard PISA rods was established as a length for a worker to reach when using the wrench-driven PISA system. Since Types RR and SS anchors also were driven by tooling attached to a torque motor, this same practical length applied to them as well.

Based on proportion, three helices equally spaced 36" apart fit well on a 7'-0" shaft. Using the same 36" spacing, two helices were placed on a 5'-0" shaft (for bed-mounted diggers) and four helices were placed on a 10'-0" shaft. The three helix configuration quickly became the most popular Type SS lead section and remains so today. Three-foot (36") spacing remained the norm for Types RR and SS, as well as for HS-8, HS-11, and HS-14 High-Strength guy anchors developed later in the 1960s.

Geotechnical science evolves changes

In the 1970s and early 1980s, a gradual change in the design philosophy at Chance eventually led to changes in inter-helix spacing. Adopting generally accepted geotechnical engineering principles, it was recognized that a deep buried plate (i.e., screw anchor helix) transferred an applied load to the soil in end bearing (bearing capacity theory).

This transfer of load results in a "stress zone" within a defined soil volume immediately above or below the helix depending on the direction of the load (tension - above helix, compression - below helix). A necessary condition for this method to work is that the helices must be spaced far enough apart to avoid overlapping their stress zones.

The Boussinesq (circa 1885) Equation has described the stress distribution in soil resulting from a load applied via a buried plate/footing as shown in Figure 1. For a multi-helix anchor installed into uniform, homogeneous soil, spacing helix plates too close together can result in overlapping stress distributions, which may lead to unexpected failure.

Likewise, spacing helix plates too far apart prevents soil stress overlap, but results in a screw anchor that is unnecessarily long. As can be seen in Figure 1, the magnitude of stress one diameter away from the buried plate is 28% the magnitude of stress at the plate. Note the magnitude of stress three diameters away from the buried plate is only 4% the magnitude of stress at the plate. Greater distance from the plate results in stress magnitude reduction, but at a significantly reduced rate.

What inter-helix spacing is optimum?

The Boussinesq Equation suggests a spacing of three-helix diameters as a practical solution based on stress distribution. The design question posed by the above discussion also has been answered by two other accepted principles.

The bearing capacity theory (Figure 2, plate bearing model) suggests the capacity of a multi-helix screw anchor is equal to the sum of the capacities of the individual helix plates. Calculating the unit bearing capacity of the soil and multiplying by the individual helix areas determine the total end-bearing capacity.

The cylindrical shear theory (Figure 3, cylindrical shear model) suggests the capacity of a multi-helix screw anchor is equal to the bearing capacity of the top-most helix (tension load), plus the friction capacity resulting from the shear strength of the soil along a cylinder bounded by the top and bottom helix with a diameter defined by the average of all helix diameters on a multi-helix anchor.

Both cylindrical shear and individual bearing represent permissible failure mechanisms for any inter-helix spacing, therefore the ultimate capacity associated with them are upper bounds of the actual ultimate capacity at all spacings (see Figure 4). At "small" spacings, cylindrical shear is the least upper bound and controls capacity, per the Least Upper-Bound Theorem. At "large" spacings, individual bearing becomes the least upper bound and controls capacity.

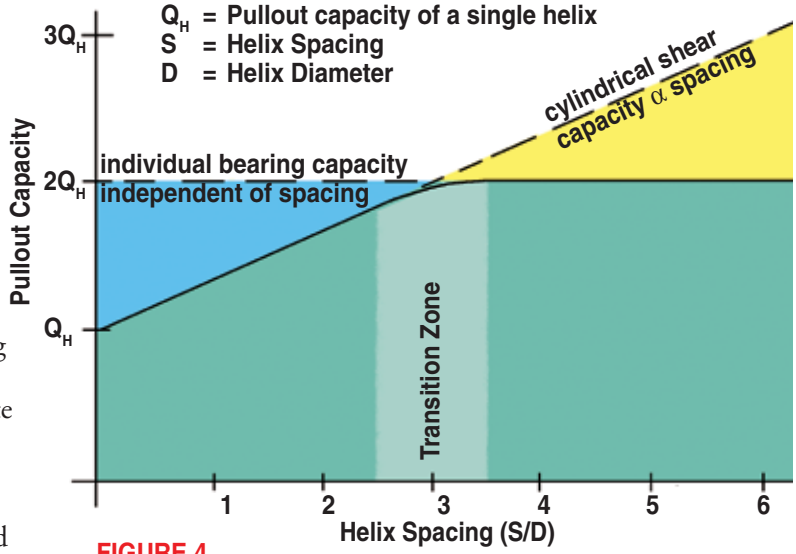


FIGURE 4
Pullout Capacity of 2-Helix Anchor vs Helix Spacing

To determine where the transition occurs from cylindrical shear to indivdual bearing, data from late 1970's field tests were analyzed. The interpreted results indicate that the transition spacing is about three diameters, as is indicated in Figure 4. This is consistent with the performance of multi-belled concrete piers (Bassett, 1977) and with the fact that the cylindrical shear and individual bearing methods usually give similar results for screw anchors with three-helix diameters spacing.

Industry Standard derived from CHANCE® three-diameters spacing

It is important to understand that soils generally are not homogeneous mixtures exhibiting uniform strength properties. Spacing helix plates unnecessarily far apart increases the possibility that one or more of them will not be located in the same soil layer as the others.

The key is to space the helix plates just far enough apart to maximize the bearing capacity of a given soil.

This works to reduce the overall length of the anchor and increases the likelihood for all helix plates to be located in the same soil layer. This leads to more predictable torque-to-capacity relationships and better creep (movement under load) characteristics.

Today, Chance manufactures helical screw anchors with three-helix-diameters spacing, the space between any two helices being three times the diameter of the lower helix. This is the optimum spacing that historically has been sufficient to prevent one helix from significantly influencing the performance of another, while at the same time preventing the previously mentioned disadvantages of spacing helices too far apart.

INDUSTRY STANDARD

A Definition: Three-helix-diameter spacing –

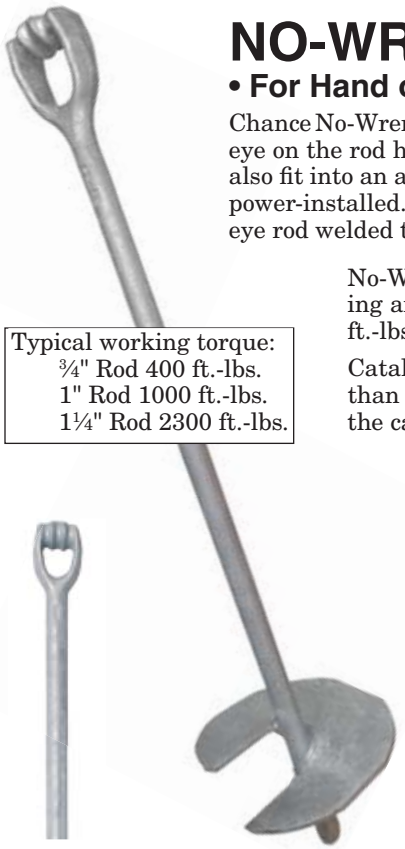
The optimum space between any two helical plates on a screw anchor is three times the diameter of the lower helix.

With the introduction of Chance Type SS150, SS175, SS200, and SS225 High Strength SS Anchors in the late 1970's and early 1980's, helix plates were located on the shaft using three-helix-diameters spacing. Type HS anchors were changed to this spacing in 1986. The standard-strength SS, known as the SS5 series, remained at 36 inch spacing until 1997, when it also was updated to the industry standard of three-diameters spacing, now common to other Chance shaft-driven multi-helix screw anchors. ■

NO-WRENCH SCREW ANCHOR

• For Hand or Machine Installation

Chance No-Wrench Screw Anchors may be installed by hand or machine. The THIMBLEYE® eye or TRIPLEYE® eye on the rod has a large opening to admit a turning bar for screwing the anchor down. The eye will also fit into an adapter available from most hole-boring machine manufacturers so the anchor may be power-installed. The No-Wrench Screw Anchor consists of a drop-forged steel THIMBLEYE® eye or TRIPLEYE® eye rod welded to a steel helix. The entire anchor is hot-dip galvanized for long resistance to rust.



Typical working torque:
¾" Rod 400 ft.-lbs.
1" Rod 1000 ft.-lbs.
1¼" Rod 2300 ft.-lbs.

No-Wrench Screw Anchors can be installed to a greater depth to reach a firmer soil by using an extension rod, available in three lengths below. Maximum installing torque is 2300 ft.-lbs. for 1¼" diameter rod.

Catalog numbers 4345, 6346 and PS816 may be ordered with a forged THIMBLEYE® rod rather than the standard TRIPLEYE® rod. To order a THIMBLEYE® rod simply add "1" to the suffix of the catalog number. Example: Catalog No. 63461.

Extension Rod 402 forged coupling engages forged Tripleye® fitting o Anchor rod.

APPLICATION AND ORDERING INFORMATION

Catalog No.	Description	Anchor Size Dia.	Rod Dia. & Length	Std. Pkg./ Pallet	No-Wrench Screw Anchor Holding Capacity - (lbs.) vs Soil Class		
					Class 5	Class 6	Class 7
4345	TRIPLEYE®	4"	¾" x 54"	1/100	4500	3000	1500
6346*	TRIPLEYE®	6"	¾" x 66"	1/100	6500	5000	2500
PS816	TRIPLEYE®	8"	1" x 66"	1/60	11000	9000	6000
10146	TRIPLEYE®	10"	1¼" x 66"	1/20	13000	10000	7000
10148	TRIPLEYE®	10"	1¼" x 96"	1/20	13000	10000	7000
12537	TRIPLEYE®	14"	1¼" x 96"	1/20	16000	15000	12000
43451	THIMBLEYE®	4"	¾" x 54"	1/100	4500	3000	1500
63461	THIMBLEYE®	6"	¾" x 66"	1/100	6500	5000	2500
8161	THIMBLEYE®	8"	1" x 66"	1/60	11000	9000	6000

*RUS Accepted.

Extension Rod

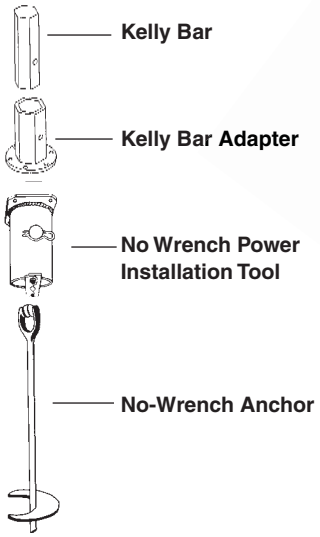
402	TRIPLEYE®	N/A	1¼" x 72"	1/50	N/A	N/A	N/A

Note: If hand installed, holding capacity may be reduced by as much as 10% to 20%. Capacity ratings apply to properly installed anchors only.

Failure to install within 5° of alignment with the guy load will significantly lower strength.

NO-WRENCH POWER INSTALLATION TOOL

"NO WRENCH" TYPICAL DRIVE STRING

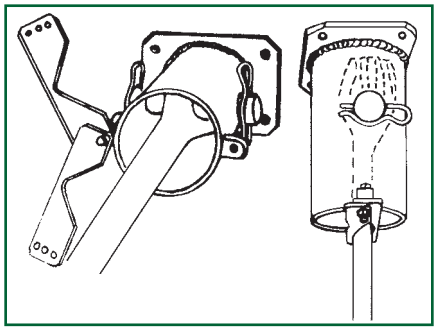


Catalog No.	Weight, lbs.
E3030255	9

Especially designed for use with the Chance portable anchor installer. This tool bolts directly to the installer's output flange or appropriate Kelly bar adapter. Adjustable pivot plates accept rods from ¾ to 1¼" diameter. Through-pin with retainer clip passes through the eyenut.

Has (four) holes on a 5¼" bolt circle for attachment. Includes (four) ½" x 1½" bolts, nuts and lockwasher.

Note: Can be attached to any Chance Torque Indicator



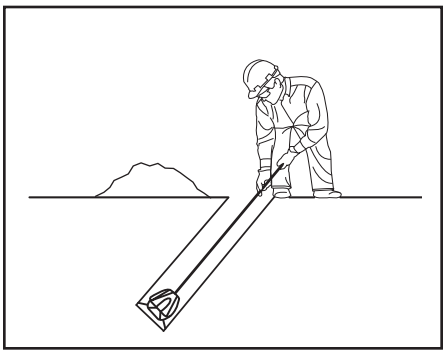
“Bust” Expanding Anchor

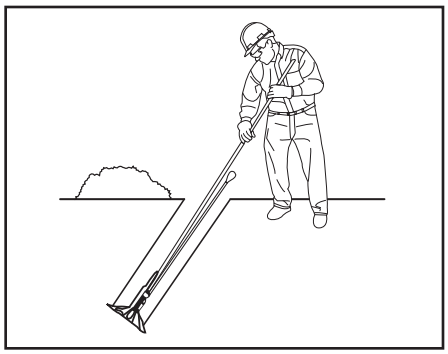
MORE HOLDING CAPACITY FOR LESS

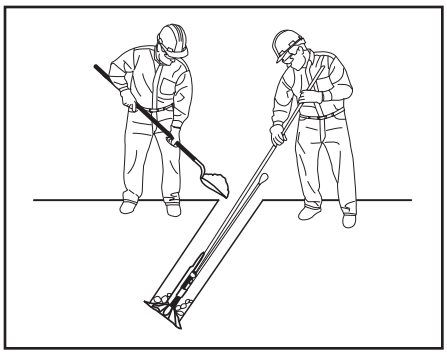
Four different sizes are available with holding capacity as high as 40,000 pounds.

Chance “Bust” Expanding Anchors expand to take full advantage of the available area. All eight blades wedge into undisturbed earth . . . there is no wasted space between blades.

This anchor should be installed in relatively dry and solid soils. The effectiveness of the anchor is dependent upon the thoroughness of backfill tamping.







B

APPLICATION AND ORDERING INFORMATION

Catalog Number	Anchor Hole Size	Area Sq. In.	Rod Size (Order Separately)	Std. Pkg./ Pallet	8-Way Anchor Holding Capacity - (lbs.) vs Soil Class				
					Class 3	Class 4	Class 5	Class 6	Class 7
6870*	6"	70	⅝"	12/288	16000	14000	11000	8500	5000
88135*	8"	135	⅝" or ¾"	6/150	26500‡	22000‡	18000‡	15000	10000
1082	10"	200	1"	4/48	31000	26500	21000	16500	12000
108234	10"	200	¾"	4/48	31000‡	26500‡	21000	16500	12000
1283	12"	300	1¼"	2/26	40000	34000	26500	21500	16000
12831	12"	300	1"	2/26	40000‡	34000	26500	21500	16000

‡Ultimate strength of rod may limit holding capacity. (See page B-22 for rod ratings and selection.)
Add suffix "G" for galvanized. Example: 88135G.
*RUS Accepted.
Note: Capacity ratings apply to properly installed anchors only.
Failure to install within 5° of alignment with the guy load will significantly lower strength.

EXPANDING & TAMPING BAR

The improved Chance fiberglass handle Expanding and Tamping Bar simplifies the job of expanding anchors. The curved Tamper and Expander Head distributes the weight of the bar evenly around the anchor rod to reduce handle vibration. The hook of the Expanding and Tamping Bar wraps around the anchor rod to keep the Expanding Head from slipping off the anchor top plate. This tool is also effectively used for tamping in soil above the installed anchor. The base casting is attached directly to the Epoxiglas® handle.

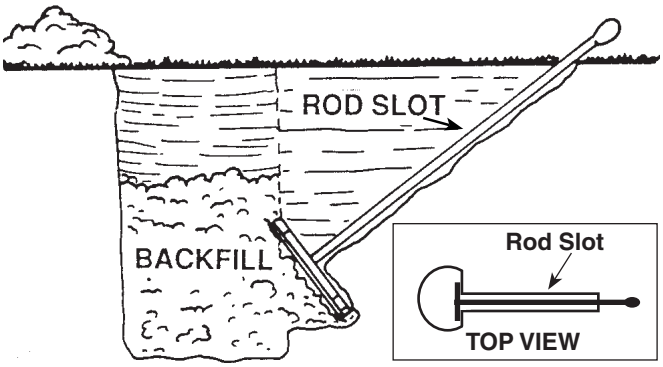
Cat. No.	Description	Length	Weight
C3020003	Expanding & Tamping Bar	10'	22 lbs.
C3020004	Expanding & Tamping Bar	12'	24 lbs.

To order fiberglass replacement handles or expander head, see page B-36.

Cross-Plate Anchor

The Cross-Plate anchor is made for installation in holes drilled by power diggers. Because the size of the hole does not affect holding capacity, the hole can be dug by the same auger that is used to dig the pole holes on transmission projects.

Cross-Plate anchors are installed in a diagonal bored hole which is undercut so the anchor is at right angles to the guy. A rod trench is either cut with a trenching tool or drilled with a small power auger. Both anchor and rod trench should be refilled and tamped.



APPLICATION AND ORDERING INFORMATION

Catalog Number	Hole Size	Std. Pkg./ Pallet	Approx. Wt. per Carton†	Area Sq. In.	Rod Size (order separately)	Holding Capacity‡ - (lbs.) (No Safety Factors Included) vs Soil Class				
						Class 3	Class 4	Class 5	Class 6	Class 7
X16	16"	6/108	90 lb.	150	5/8", 3/4"	26500‡	22500‡	18500‡	14500	9500
X20	20"	4//64	64 lb.	250	5/8", 3/4"	34000‡	29000‡	24000‡	19000‡	14000
X201	20"	4/64	64 lb.	250	1"	34000	29000	24000	19000	14000
X2434*	24"	1/48	34 lb.	400	5/8", 3/4"	45000‡	37000‡	30000‡	23500‡	18000‡
X24†	24"	1/48	34 lb.	400	1"	45000‡	37000‡	30000	23500	18000
X241†	24"	1/48	34 lb.	400	1 1/4"	45000	37000	30000	23500	18000

†X24 Series are not available in carton and are shipped as individual pieces.

‡Ultimate strength of rod may limit holding capacity. (See page B-22 for rod ratings and selection.)
Add suffix "G" for galvanized. Example: X20G.
*RUS Accepted.
Note: Capacity ratings apply to properly installed anchors only.
Failure to install within 5° of alignment with the guy load will significantly lower strength.

Rods, Anchor, Galvanized • Extensions

These anchor rod extensions primarily are for making above-grade connections between installed anchors and guy wires. Each extension's forged eye is designed to distribute pulling stresses uniformly over individual strands of guy wire and keep the guy wire from spreading, kinking, or bending.

The drop-forged eye of each extension rod is stronger than the rod itself. Rod length and diameter are stamped below each rod eye.

Each extension rod includes a high-strength bolt and nut.

Welded Clevis style

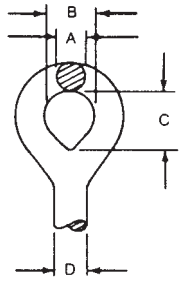
Catalog No.	Description	Rod Dia. & Length	Std. Pkg. /Pallet
PSC1022176	TRIPLEYE®	3/4" x 24"	1/50
PSC1022177	TRIPLEYE®	3/4" x 36"	1/50
PSC1022178	TRIPLEYE®	3/4" x 72"	1/50
PSC1022183	**TWINEYE®**	1" x 24"	1/50
PSC1022305	TRIPLEYE®	1" x 24"	1/50
PSC1022184	**TWINEYE®**	1" x 36"	1/50
PSC1022306	TRIPLEYE®	1" x 36"	1/50
PSC1022185	**TWINEYE®**	1" x 72"	1/50
PSC1022307	TRIPLEYE®	1" x 72"	1/50

Forged Clevis style

Catalog No.	Description	Rod Dia. & Length	Std. Pkg. /Pallet
4022	TRIPLEYE®	1 1/4" x 24"	1/50
PS4023	TRIPLEYE®	1 1/4" x 36"	1/50
402	TRIPLEYE®	1 1/4" x 72"	1/50

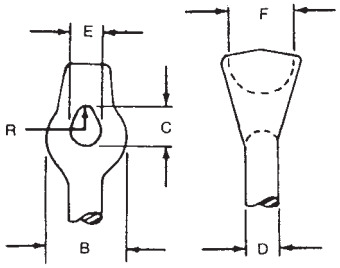
Rods, Anchor, Galvanized

Available for one, two, or three guys for use with expanding and cross-plate anchors. THIMBLEYE®, TWINEYE® and TRIPLEYE® rods distribute pulling stresses uniformly over individual strands of guy wire and keep the guy wire from spreading, kinking, or bending. The drop-forged eye of each anchor rod is stronger than the rod itself. Rod length and diameter are stamped below each rod eye. Each rod is threaded 3 1/2" minimum length. Nuts included.



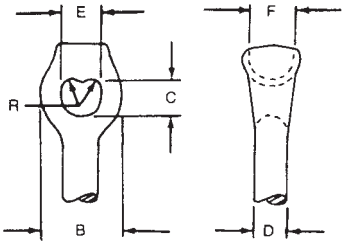
OVALEYE ADAPTER

D	A	B	C
5/8"	9/16"	1 1/2"	2"
1"	7/8"	1 1/2"	2"



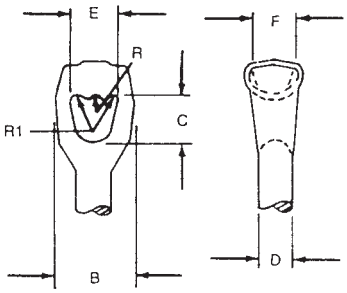
THIMBLEYE® ADAPTER

D	*R	B	C	E	F
1/2"	3/16"	1 1/4"	9/16"	1/2"	1 1/4"
5/8"	1/4"	1 1/2"	11/16"	9/16"	1 3/8"
3/4"	9/32"	1 5/8"	13/16"	11/16"	1 1/2"
1"	13/32"	2 1/16"	1 1/8"	15/16"	1 5/8"



TWINEYE® ADAPTER

D	*R	B	C	E	F
5/8"	7/32"	1 3/4"	7/8"	15/16	1 1/4"
3/4"	1/4"	2"	1"	1 1/16"	1 3/8"
1"	5/16"	2 5/8"	1 3/16"	1 5/16	1 1/2"
1 1/4"	3/8"	2 15/16"	1 1/4"	1 9/16"	1 5/8"



TRIPLEYE® ADAPTER

D	*R	*R1	B	C	E	F
3/4"	1/4"	7/32"	2 1/2"	1 11/16"	1 1/2"	1 1/4"
1"	1/4"	7/32"	2 9/16"	1 11/16"	1 5/8"	1 1/2"
1 1/4"	9/32"	1/4"	2 7/8"	1 11/16"	1 11/16"	1 5/8"

TENSILE STRENGTH

Rod Size, in.	Strength, lb.
1/2	10,000
5/8	16,000
3/4	23,000
1	36,000
1 1/4	58,000

*(2 x R or 2 x R1) = maximum-diameter guy strand.

Catalog No.					+Protected Rods - Catalog No.		
THIMBLEYE® Adapter	TWINEYE® Adapter	TRIPLEYE® Adapter	Ovaleye Adapter	Size	THIMBLEYE® Adapter	TWINEYE® Adapter	TRIPLEYE® Adapter
5305	—	—	—	1/2 x 5'	—	—	—
5306	—	—	—	1/2 x 6'	—	—	—
5307	—	—	—	1/2 x 7'	—	—	—
5315	—	—	—	5/8" x 5'	—	—	—
†*5316	5346	—	—	5/8" x 6'	—	—	—
†*5317	†*5347	—	PS6417	5/8" x 7'	—	—	—
†*5318	†*5348	—	—	5/8" x 8'	—	—	—
*5326	*5356	—	—	3/4" x 6'	C2000088	C2000092	—
*5327	*5357	*7557	—	3/4" x 7'	C2000089	C2000093	C2000099
†*5328	†*5358	7558	—	3/4" x 8'	C2000090	C2000094	C2000098
—	†*5359	7559	—	3/4" x 9'	—	C2000095	C2000097
—	†5360	—	—	3/4" x 10'	C2000091	C2000096	—
*5338	*5368	7568	—	1" x 8'	C2000102	—	C2000105
—	†5369	—	6440	1" x 9'	—	C2000100	—
†*5340	†*5370	7570	—	1" x 10'	C2000103	C2000101	C2000104
—	—	C2000028	—	1 1/4 x 8'	—	—	—
—	15129	7574	—	1 1/4 x 10'	—	—	—

*N.E.M.A. Standard
†RUS Accepted.
+Galvanized rod and square nuts meet NEMA specification plus have polyethylene tube. No asphalt paint is added, so tube can slide down after anchor is expanded.

EXPANDING ROCK ANCHORS

CLOSED OPEN

• Saves Time, Labor, Money

The Chance Expanding Rock Anchor is a big time, labor, and money saver . . . because, in most cases, there is no need to mix concrete, melt lead, or carry extra, bulky equipment to the job. Generally, the cost of installing the Expanding Rock Anchor is about 35% less than the old-fashioned grouting method

• Expands and Wedges

This anchor expands and wedges against solid walls of rock. And, once it is expanded, the harder the pull on the rod—the tighter it wedges. Wedges are made of malleable or ductile iron with a rust-resistant coating. Rod should be in line with the guy.

• Installation

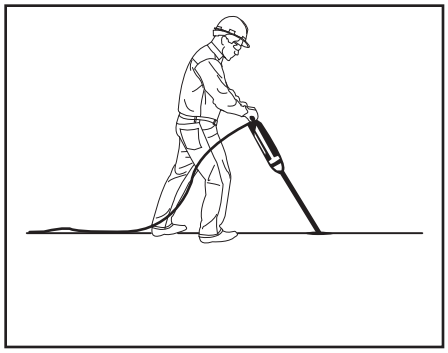
Installation is quick and simple. Bore the hole with hand or power drill, making sure that the diameter of the hole is ¼-inch larger than the diameter of the unexpanded anchor. Drop the anchor in the hole. Put a bar through the large eye of the anchor rod. Turn the rod until the anchor is firmly expanded against the sides of the hole. Grouting should be done if protection of the rock against weathering is a concern.

This wedging force holds the anchor securely in place—to stay.

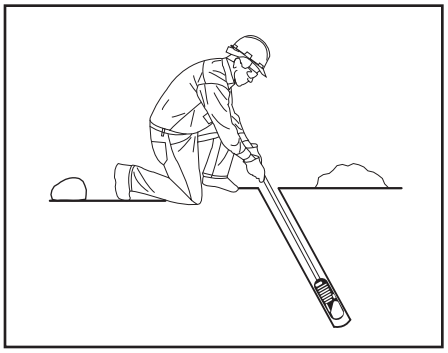
• 1, 2 or 3 Guy Strands

The large drop-forged TRIPLEYE® rod of high-test steel holds up to three guy strands. The contour of the eye grooves keeps the guy strands from spreading, kinking, bending. . . and allows slack to be pulled up without binding, damaging, or weakening the guy.

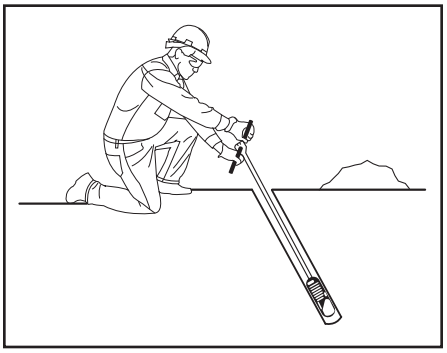
B



Drill hole . . .



. . . push anchor into hole



. . . turn rod to expand.

Cat. No.	Rod Dia.	Rod Lth.	Anchor Size	Anchor Fully Exp'd	Hole Size	Approx Weight Per 100	No. in. Bdl.
R315*	¾"	15"	1¾"	2⅜"	2"	500	5
R330*	¾"	30"	1¾"	2⅜"	2"	700	5
R353*	¾"	53"	1¾"	2⅜"	2"	960	5
R360	¾"	60"	1¾"	2⅜"	2"	1040	5
R372	¾"	72"	1¾"	2⅜"	2"	1200	5
R384	¾"	84"	1¾"	2⅜"	2"	1300	5
R396	¾"	96"	1¾"	2⅜"	2"	1460	5

Cat. No.	Rod Dia.	Rod Lth.	Anchor Size	Anchor Fully Exp'd	Hole Size	Approx Weight Per 100	No. in. Bdl.
R130L	1"	30"	2¼"	3⅛"	2½"	1166	3
R153L	1"	53"	2¼"	3⅛"	2½"	1833	3
R172L	1"	72"	2¼"	3⅛"	2½"	2133	3
R196L	1"	96"	2¼"	3⅛"	2½"	2666	3

*RUS Accepted.
¾" Rod Minimum Ultimate Strength of 23,000 pounds.
1" Rod Minimum Ultimate Strength of 36,000 pounds.

Ultimate strength ratings apply to properly installed anchors only.
Failure to install within 5° of alignment with the guy load will significantly lower strength.
Recommended minimum installation depth is 12" in solid rock.

Expanding Pole Key Anchor

CLOSED

• Quicker Installing, More Efficient Than Wood Key

Made of structural steel, the Chance Pole Key anchor is used where guys are impractical or as backup to guys.

The Pole Key anchor can be installed in about 15 minutes, while it takes about 3 hours to install an old-type wood key.

The Pole Key anchor is extensively used for keying power and telephone-line poles, and wood poles used in street lighting. It is also used as a pole reinforcement in soft soils where the load is unbalanced, due to small angles or crossarm configuration.

EXPANDED

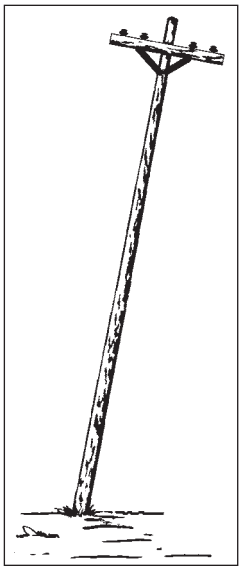
B

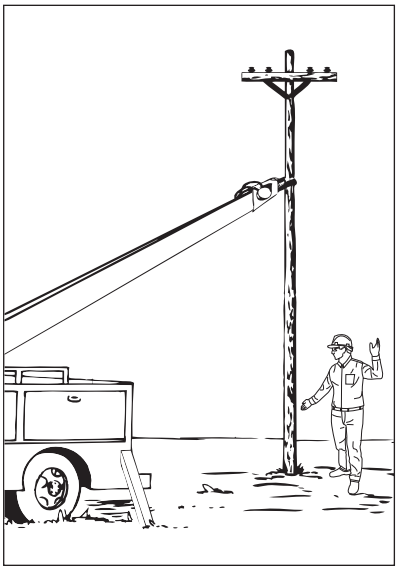
Application and Ordering Information

Catalog Number	Width Expanded	Blade Width	Area Expanded	Approx. Weight	Ultimate Resisting Force at 5 ft. Depth (lb.)			
					Soil Class 3	Soil Class 4	Soil Class 5	Soil Class 6
*P4817	27¼"	7"	276 sq. in.	24½ lb.	11,000	9,500	7,400	5,800

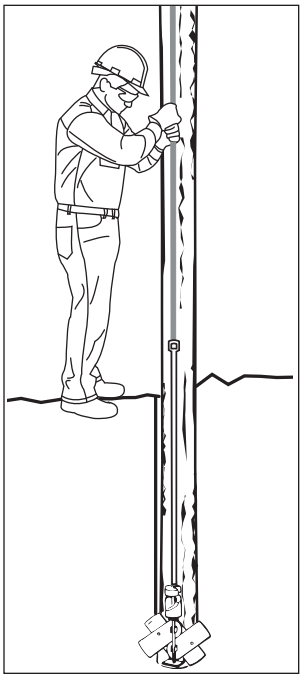
The lateral load and overturning moment which can be resisted depends on the height of the load above ground level, the depths of the two opposing Pole Keys, and the allowable lateral deflection of the pole at ground line.

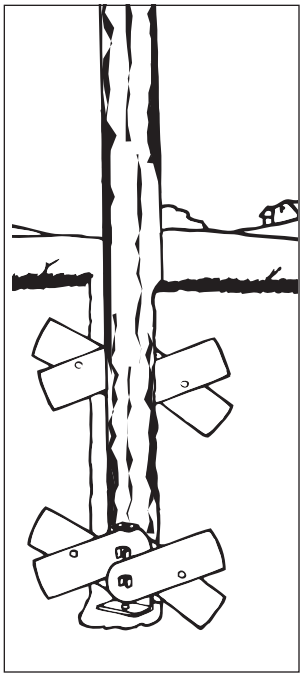
*RUS Accepted. Accommodates any ¾"-diameter rod on page B-22.





Chance Pole Key anchor is quickly installed next to a pole butt to help hold it in place against light overturning loads due to service drops, prevailing winds or small changes in line direction (See illustrations).

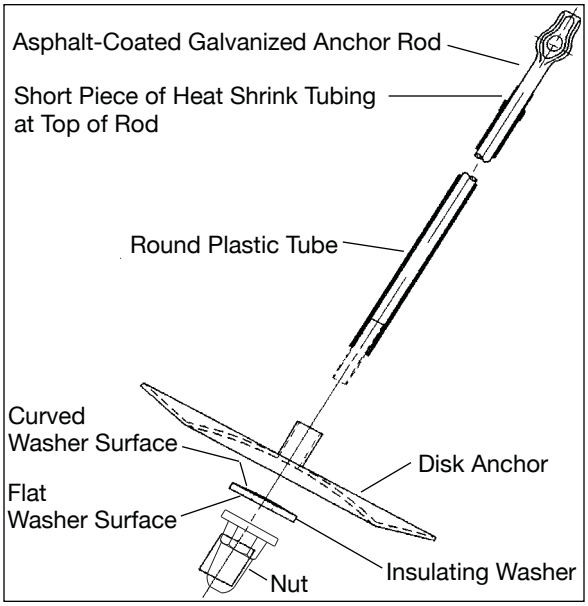




Corrosion-Resistant Anchor

Chance design offers many advantages

The Chance corrosion-resistant disc anchor is designed for low resistivity, alkaline and acidic soils with electrolite combinations. The anchor eye is forged directly to the rod, so the eye is an integral part of the anchor. The anchor's flanged cap nut is forged. It's large and heavy for greater protection. The heat-shrink sleeve over the galvanized anchor rod helps prevent moisture from going down the rod. The insulating washer is fiberglass-reinforced thermoset material for better load-bearing properties compared to thermoform materials.



Fiber-Reinforced Washer

Catalog No.	Fits Rod Size	Approx. Wt./100 pcs.
C2100033	¾"	23 lb.
C2100034	1"	19 lb.

Cap Nut

Catalog Number	Fits Rod Size	Approx. Wt./100 pcs.
C2050407	¾"	242 lb.
C2050408	1"	242 lb.

Corrosion-Resistant Anchor

Catalog No.	Description	Hole Size	Fits Protected Rod Size	Holding Capacity‡ - (lbs.) (No Safety Factors Included) vs Soil Class				
				Class 3 500-600 in-lb	Class 4 400-500 in-lb	Class 5 300-400 in-lb	Class 6 200-300 in-lb	Class 7 100-200 in-lb
C1022008	16" Anchor .187" Thick	16"	¾"	31000‡	26500‡	21000	16500	12000
C1022009	16" Anchor .187" Thick	16"	1"	31000‡	26500	21000	16500	12000
C1022011	20" Anchor .187" Thick	20"	1"	40000‡	34000	26000	21500	16000
C1022012	20" Anchor .250" Thick	20"	1"	40000‡	34000	26000	21500	16000
C1022054	24" Anchor .187" Thick	24"	1"	50000‡	41000‡	33500	26000	20000
C1022050	24" Anchor .250" Thick	24"	1"	50000‡	41000‡	33500	26000	20000

‡Ultimate strength of rod may limit holding capacity.
Note: Capacity ratings apply to properly installed anchors only.
Failure to install within 5° of alignment with the guy load will significantly lower strength.

Protected Rod for Corrosion-Resistant Anchor

These rods include fiber-reinforced washer and heavy-forged cap nut. Nut is attached to rod. Washer is shipped separately in a box. Galvanized Rod meets NEMA specification PH2 plus has asphalt coating, polyethylene tube and heat shrink collar.

Rod Size	Rod Tensile Strength, lb.	Thimbleye® Adapter		Twineye® Adapter		Tripleye® Adapter	
		Catalog No.	Lb./100 Pcs.	Catalog No.	Lb./100 Pcs.	Catalog No.	Lb./100 Pcs.
¾" x 6'	23,000	C2000047	1330	C2000053	1362	C2000106	—
¾" x 7'	23,000	C2000048	1450	C2000054	1470	—	1630
¾" x 8'	23,000	C2000049	1566	C2000055	1650	C2000061	1783
¾" x 9'	23,000	—	—	C2000056	1750	C2000062	1883
¾" x 10'	23,000	C2000050	1826	C2000057	1910	—	—
1" x 6'	36,000	—	—	—	—	C2000107	—
1" x 7'	36,000	—	—	C2000114	—	—	—
1"x 8'	36,000	C2000051	2500	C2000108	—	C2000063	2730
1"x 9'	36,000	—	—	C2000058	2800	—	—
1"x 10'	36,000	C2000052	3005	C2000059	3050	C2000064	3270

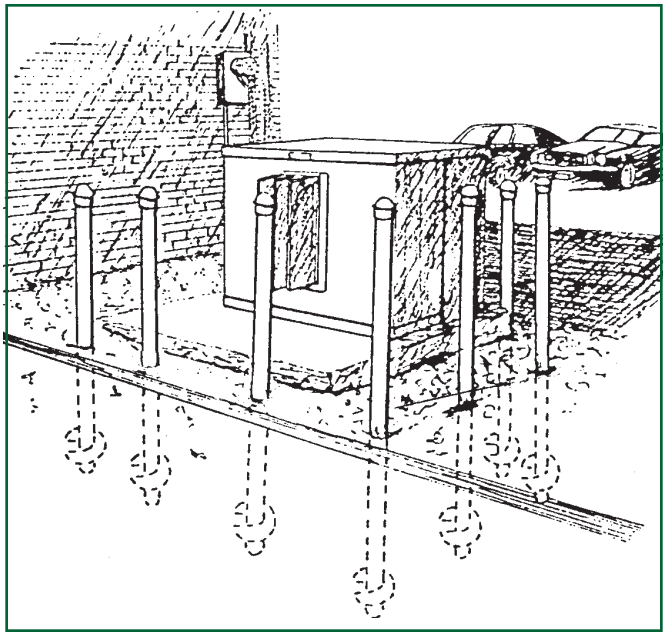
For additional sizes of rods, contact Hubbell Power Systems, Inc.

Bumper Posts

for instant equipment protection

- **Power-Installed Design**

Protect transformers, switchgear and guys. Any equipment needing bumper protection is an ideal candidate. Cheaper than concrete. Installation in minutes regardless of weather conditions. Available power diggers can install through blacktop surfaces. Hot-dip galvanized corrosion-resistant finish.



ORDERING INFORMATION
8,000 ft.-lb. Typical Working Torque

Catalog Number	Std. Pkg./ Pallet	Weight ea., lb.	Description
T1120192	1/12	45	8" Helix, 3 1/2" O.D. x 60" Shaft
T1120224	1/12	53	8" Helix, 3 1/2" O.D. x 75" Shaft
C1120275	1/12	61	8" Helix, 3 1/2" O.D. x 84" Shaft

Installing Tools

Additional tools may not be required for Bumper Post if Kelly bar can be inserted into the 3.06" inside dia. of the post and pinned by a bent-arm pin.

Tools are available which bolt directly to Chance Kelly bar adapters or which can be used with Chance locking dog assembly.

Order C3030737 for Kelly bar attachment or C3030739 for use with locking dog assembly. Bumper Post is inserted into drive tool and held by the provided bent-arm pin.

C3030739

C3030737