

REINFORCEMENT DETAILING ACCESSORIES

"Use the right supports to prevent problems, enhance durability and to maintain structural integrity"

Detailing is as important as design since proper detailing of engineering designs is an essential link in the planning and engineering process as some of the most devastating collapses in history have been caused by defective connections or DETAILING. It is very important not only for the proper execution of structures but also for its safety. The most common way of spacing reinforcing bars is through the use of reinforcing bar supports. Generally low quality good carbon steel is used.

Wire Bar Supports

Bar supports may be made of steel wire, precast concrete or plastic. Most Commonly used are factory made wire bar supports. Wire bar supports are grouped in four classes according to their intended degree of protection against causing rust spots on concrete.



Individual chairs



Slab bolsters



Class 1 -Maximum protection

Plastic protected wire bar supports, which are intended to use in situations of moderate to severe exposure or requiring light grinding or sand blasting of concrete surface.

Class 1A-Maximum protection

Epoxy coated,Vinyl coated, or plastic coated bright basic bar supports, which are intended for use in situations of maximum exposure where no grinding or sand blasting of concrete surface is required. They are generally used when epoxy coated reinforcing bars are used

Class 2 -Moderate protection

Stainless steel protected wire bar supports which are intended to use in situations of moderate exposure and situations requiring light grinding or sand blasting of concrete surface.

Class 3 -No protection

Bright basic wire bar supports, which have no protection against rusting and are intended to use in situations were surface blemishes can be tolerated or where bar supports do not come in contact with the exposed concrete surface.



TYPICAL TYPES & SIZES OF WIRE BAR SUPPORTS

SYMBOL	BAR SUPPORT ILLUSTRATION	BAR SUPPORT ILLUSTRATION PLASTIC CAPPED OR DIPPED	TYPE OF SUPPORT	TYPICAL SIZES
SB			Slab Bolster	1/4, 1, 1 1/2, and 2 in. heights in 5 ft and 10 ft lengths
SBU'			Slab Bolster Upper	Same as SB
BB			Beam Bolster	1, 1 1/2, 2 to 5 in. heights in increments of 1/4 in. in lengths of 5 ft.
BBU'			Beam Bolster Upper	Same as BB
BC			Individual Bar Chair	1/4, 1, 1 1/2, and 1 3/4 in. heights
JC			Jolt Chair	4, 5, and 6 in. widths and 1/4, 1 and 1 1/2 in. heights
HC			Individual High Chair	2 to 15 in. heights in increments of 1/4 in.
HCM'			High Chair for Metal Deck	2 to 15 in. heights in increments of 1/4 in.
CHC			Continuous High Chair	Same as HC in 5 ft and 10 ft lengths
CHCU'			Continuous High Chair Upper	Same as CHC
CHCM'			Continuous High Chair for Metal Deck	Up to 5 in. heights in increments of 1/4 in.
JCU''			Jolt Chair Upper	14 in. span; heights -1 in. thru +3 1/2 in. vary in 1/4 in. increments
CS			Continuous Support	1 1/2 to 12 in. in increments of 1/4 in. in lengths of 6'-8"
SBC			Single Bar Centralizer (Friction)	6 in. to 24 in. diameter



TYPICAL WIRE SIZES & GEOMETRY








SYMBOL	NOMINAL HEIGHTS ²	TYPICAL WIRE SIZES				USUAL GEOMETRY
		CARBON STEEL			STAIN-LESS STEEL ⁴	
		TOP ³	LEGS	RUNNER	LEGS	
SB	All	4 ga.	6 ga.	N/A	8 ga.	Legs spaced 5 in. on center.
SBU	All	4 ga.	6 ga.	7 ga.	—	Same as SB
BB	Up to 1½ in. incl	7 ga.	7 ga.	N/A	9 ga.	Legs spaced 2½ in. on center.
	Over 1½ in. to 2 in. incl	7 ga.	7 ga.	N/A	8 ga.	
	Over 2 in. to 3½ in. incl	4 ga.	4 ga.	N/A	7 ga.	
	Over 3½ in.	4 ga.	4 ga.	N/A	—	
BBU	Up to 2 in. incl	7 ga.	7 ga.	7 ga.	—	Same as BB.
	Over 2 in.	4 ga.	4 ga.	4 ga.	—	
BC	All	N/A	7 ga.	N/A	9 ga.	—
JC	All	N/A	6 ga.	N/A	9 ga.	—
HC	2 in. to 3½ in. incl	N/A	4 ga.	N/A	7 ga.	Legs at 20° or less with vertical. When height exceeds 12 in., legs are reinforced with welded cross wires or encircling wires.
	Over 3½ in. to 5 in. incl	N/A	4 ga.	N/A	—	
	Over 5 in. to 9 in. incl	N/A	2 ga.	N/A	—	
	Over 9 in. to 15 in. incl	N/A	0 ga.	N/A	—	
HCM	2 in. to 5 in. incl	N/A	4 ga.	N/A	—	Same as HC. The longest leg will govern the size of wire to be used.
	Over 5 in. to 9 in. incl	N/A	2 ga.	N/A	—	
	Over 9 in. to 15 in. incl	N/A	0 ga.	N/A	—	
CHC	2 in. to 3½ in. incl	2 ga.	4 ga.	N/A	7 ga.	Legs at 20° or less with vertical. All legs 8¼ in. on center maximum, with leg within 4 in. of end of chair, and spread between legs not less than 50% of nominal height.
	Over 3½ in. to 5 in. incl	2 ga.	4 ga.	N/A	—	
	Over 5 in. to 9 in. incl	2 ga.	2 ga.	N/A	—	
	Over 9 in. to 15 in. incl	2 ga.	0 ga.	N/A	—	
CHCU	2 in. to 5 in. incl	2 ga.	4 ga.	4 ga.	—	Same as CHC
	Over 5 in. to 9 in. incl	2 ga.	2 ga.	4 ga.	—	
	Over 9 in. to 15 in. incl	2 ga.	0 ga.	4 ga.	—	
CHCM	Up to 2 in. incl	4 ga.	6 ga.	N/A	—	With 4 ga. top wire, maximum leg spacing is 5 in. on center. With 2 ga. top wire, maximum spacing is 10 in. on center.
	Up to 2 in. incl	2 ga.	4 ga.	N/A	—	
	Over 2 in. to 5 in. incl	2 ga.	4 ga.	N/A	—	
JCU	-1 in. to +3½ in. incl (Measured from form to top of middle portion of saddle bar) in ¼ in. increments.	#4 [#13] bar or ½ in. dia	2 ga.	N/A	—	Legs spaced 14 in. on center. Maximum height of JCU at support legs should be slab thickness minus ¼ in.
CS	1½ in. to 7 in. incl	8 ga.	8 ga.	8 ga.	—	Legs spaced 6 in. on center, 4 in. on center at bend point. Middle runner used for heights over 7 in.
	5 in. to 12 in. incl	6 ga.	6 ga.	6 ga.	—	
	7½ in. to 12 in. incl	4 ga.	4 ga.	4 ga.	—	
SBC	6 in. ⁵	N/A	3 ga.	N/A	—	—
	12 in. to 14 in. ⁵	N/A	3 ga.	N/A	—	
	16 in. to 18 in. ⁵	N/A	3 ga.	N/A	—	



Precast Bar Supports

Precast concrete bar supports are normally supplied in three styles (a) plain, (b) with wire and (c) doweled.

TYPICAL TYPES & SIZES OF PRECAST CONCRETE BAR SUPPORTS

SYMBOL	BAR SUPPORT ILLUSTRATION	TYPE OF SUPPORT	TYPICAL SIZES, IN.	DESCRIPTION
PB		Plain Block	A— $\frac{1}{4}$ to 6 B—2 to 6 C—2 to 48	Used when placing bars off grade and formwork. When "C" dimension exceeds 16 in. the block should be cast with a piece of reinforcing bar inside the block.
WB		Wired Block	A— $\frac{1}{4}$ to 4 B—2 to 3 C—2 to 3	Generally, block is cast with embedded 16-gauge tie wire, commonly used against vertical forms or in positions necessary to secure the block by tying to the reinforcing bars.
CB		Combination Block	A—2 to 4 B—2 to 4 C—2 to 4 D—fits #3 to #5 [#10 to #16] bar	Commonly used on horizontal work.
DB		Dowel Block	A—3 B—3 to 5 C—3 to 5 D—hole to accommodate a #4 [#13] bar	Used to support top mat from dowel placed in hole. Block can also be used to support bottom mat.
DSSS		Side-Form Spacer - Wired	Concrete cover, 2 to 6	Used to align the reinforcing bar cage in a drilled shaft.* Commonly 16-gauge tie wires are cast in the spacer. Supports for 5 in. to 6 in. cover have 9-gauge tie wires at top and bottom of the spacer.
DSBB		Bottom Bolster - Wired	Concrete cover, 3 to 6	Used to keep the reinforcing bar cage off of the floor of the drilled shaft.* Support for 6 in. concrete cover is actually 8 in. in height with a 2 in. shaft cast in the top of the bolster to hold the vertical bar.
DSWS		Side-form spacer for drilled shaft applications	Concrete cover, 3 to 6	Generally used to align reinforcing bar in a drilled shaft.* Commonly manufactured with two sets of 12-gauge annealed wires, assuring proper clearance from the shaft wall surface.



Plain precast concrete bar supports are used to support reinforcing bars on ground.

Precast concrete bar supports with wires are used in applications such as where it is necessary to maintain position of the support by tying to reinforcement bars .

Doweled precast bar supports are are cast with a hole in center large enough to insert areinforcing bar with 90degree bent at the top. 90degree bend is used to support the bars. At the same time, it also cn be used to support bottom bars off the ground by placing the bars on either side of dowel bars.

All plastic Bar Supports

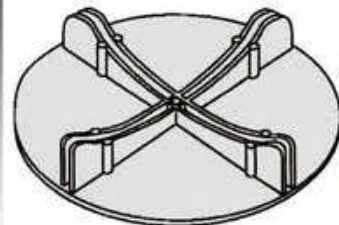
All plastic bar supports are light weight , non porous and chemically inert in concrete. These supports are suited inn situations of moderate to severe exposure or requiring light grinding or sand blasting of concrete surface



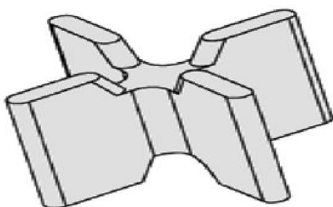
Individual chairs



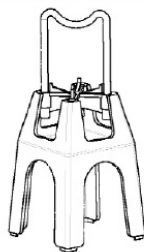
Bar Span clip



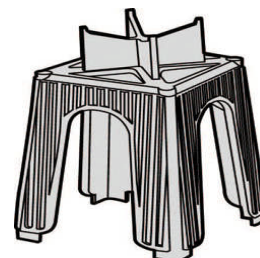
E-Z chair



X chairs

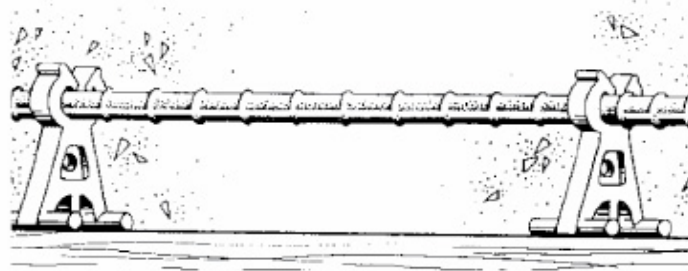


Hybrid Chairs

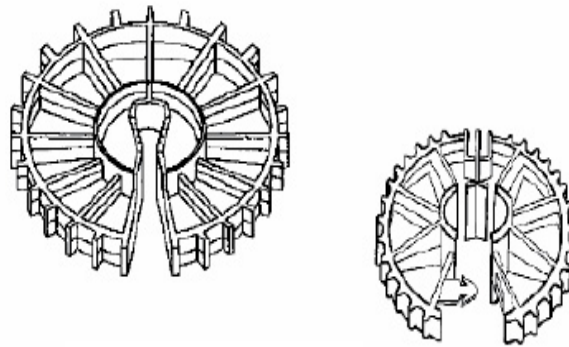


Tower Chair

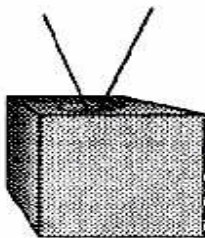




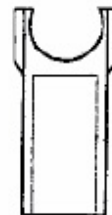
Preco clip



Bar span wheel











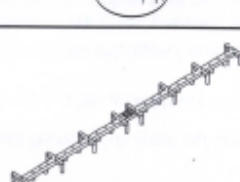
Dobie



Rebar saddle



TYPICAL TYPES & SIZES OF ALL PLASTIC BAR SUPPORTS

SYMBOL	BAR SUPPORT ILLUSTRATION	TYPE OF SUPPORT	TYPICAL SIZES, IN.	DESCRIPTION
BS		Bottom Support	Heights, 1/4 to 6	Generally for horizontal work. Not recommended for ground or exposed aggregate finish.
BS-CL		Bottom Support	Heights, 1/4 to 2	Generally for horizontal work, provides bar clamping action. Not recommended for ground or exposed aggregate finish.
HC		High Chair	Heights, 1/4 to 5	For use in slabs or panels.
HC-V		High Chair, Variable	Heights, 2 1/2 to 6 1/4	For horizontal and vertical work. Provides for different heights.
WS		Wheel Side-Form Spacer	Concrete cover, 1/4 to 3	Generally for vertical work. Bar clamping action and minimum contact with forms. Applicable for column reinforcing bars.
DSWS		Side-Form Spacer for drilled shaft applications	Concrete cover, 2 1/2 to 6	Generally used to align reinforcing bars in a drilled shaft.* Two-piece wheel that closes and locks on to the tie or spiral assuring proper clearance from the shaft wall surface.
VLWS		Locking Wheel Side-Form Spacer for all vertical applications	Concrete cover, 1/4 to 6	Generally used in both drilled shaft* and vertical applications where heavy loading occurs. Surface spines provide minimal contact while maintaining required tolerance.
DSBB		Bottom Bolster (Gripping)	Concrete cover, 3 Height, 6	Used to keep the reinforcing bar cage off of the bottom floor of a drilled shaft.* Fits #6 through #11 (#19 through #36) reinforcing bars.
SB		Slab Bolster	Heights, 1/4 to 3 Lengths up to 32**	Commonly used in horizontal and vertical applications. When used as a side-form spacer in vertical work, slab bolster must be tied to the reinforcement.

References:

- www.china-barsupports.com
- www.masco.net
- Manual of standard practise, CRSI

