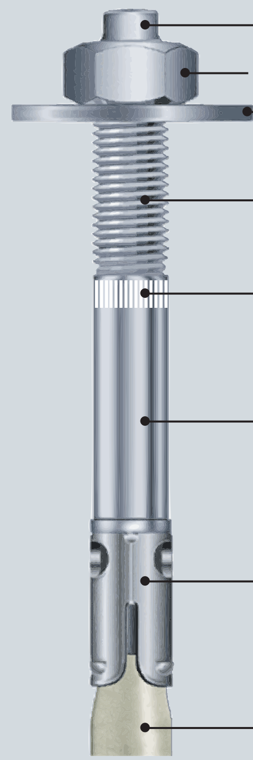
SRS TZ WEDGE ANCHOR

DESCRIPTION

UCAN SRS TZ wedge anchor combines high ultimate loads with minimal anchor spacing and edge distance. The expansion cone is coated with a patented, durable and temperature resistant surface treatment. This feature controls the friction between the expansion cone and the expansion sleeve; not only at the time of installation, but also over the lifetime of the fastening.



FEATURES

- ACI 318, category 1 anchor (high reliability)
- Suitable for seismic, tension zone (cracked concrete) anchoring application
- Available in carbon and 304 / 316 Stainless Steel
- High load capacity
- Patented surface treatment on expansion cone for reliable performance
- Through fastening

APPROVALS

- ICC ES listing (ESR - 2461)
- Tested in accordance with ACI 255 and AC 193

TYPICAL APPLICATIONS

- Seismic anchoring
- Structural steel column and frame installation
- Machinery and equipment installation
- Vibratory loading applications
- Parking structure rehabilitation
- Road and bridge construction
- Crane, conveyor installation
- Robotics

MATERIAL SPECIFICATIONS

		Specifications	
Anchor Component	Carbon Steel	304 SS	316 SS
Anchor Body	Cold formed: DIN EN 10263-3	AISI/SAE 304	AISI/SAE 316
Nut	ASTM A 563	ASTM F 563 304 Alloy group	ASTM F 563 316 Alloy group
Washer	ANSI/ASME B18.22.1,	ANSI/ASME B18.22.1, 304 Alloy group	ANSI/ASME B18.22.1, 316 Alloy group
Expansion Sleeve	AISI/SAE grade 304	AISI/SAD grade 304	AISI/SAD grade 316
Corrosion Protection	Zinc plated ASTM B 633	304 SS	316 SS

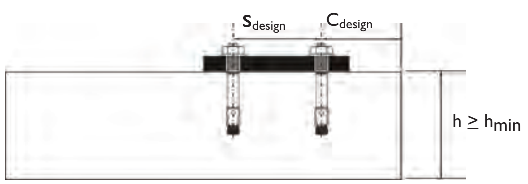
SRS TZ WEDGE ANCHOR

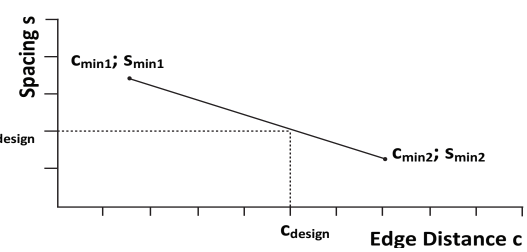
INSTALLATION DATA

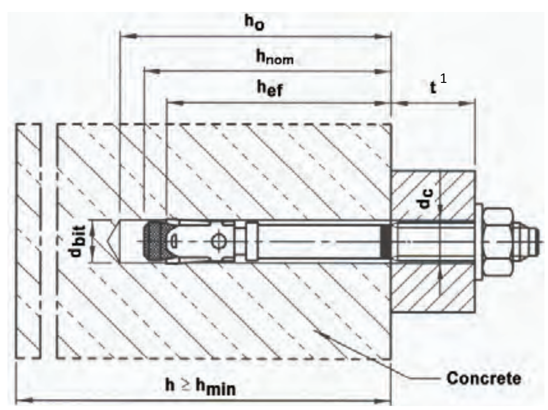
Setting Information	Symbol	Units	Nominal anchor diameter	
			½ inch	⅝ inch
Nominal Diameter	d_0	in. (mm)	½ (12.7)	5/8 (15.9)
Drill Bit Diameter	d_{bit}	in. (mm)	½	5/8
Minimum Hole Depth	h_0	in. (mm)	3 1/4 (83)	4 1/8 (105)
Minimum Base Plate Clearance Hole Diameter [2]	d_c	in. (mm)	9/16 (14.3)	11/16 (17,5)
Installation Torque (Carbon Steel)	T_{inst}	ft-lbf (N-m)	35 (47.5)	65 (90)
Installation Torque (304 Stainless Steel)	T_{inst}	ft-lbf (N-m)	60 (80)	110 (150)
Installation Torque (316 Stainless Steel)	T_{inst}	ft-lbf (N-m)	60 (80)	96 (130)
Embedment Depth	h_{nom}	in. (mm)	2 7/8 (73)	3 3/4 (95)
Effective Embedment Depth	h_{ef}	in. (mm)	2 ½ (64)	3 1/4 (83)
Minimum Edge Distance	c_{min1}	in. (mm)	5 (127)	6 (152)
Minimum Spacing [3]	s_{min1}	in. (mm)	2 ½ (64)	3 (76)
Minimum Edge Distance	c_{min2}	in. (mm)	3 (76)	3 ½ (89)
Minimum Spacing [4]	s_{min2}	in. (mm)	6 (152)	9 ½ (241)
Minimum Concrete Thickness	h_{min}	in. (mm)	5 (127)	6 ½ (165)

For **SI**: 1 inch = 25.4 mm, 1 ft-lbf = 1.356 N-m.

[1] The information presented in this table must be used in conjunction with the design requirements of ACI 318 Appendix D.
[2] The clearance must comply with applicable code requirements for the connected element.
[3] s_{min1} applies when c_{min1} is provided.
[4] s_{min2} applies when c_{min2} is provided.



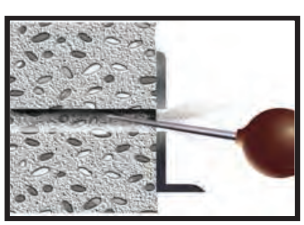




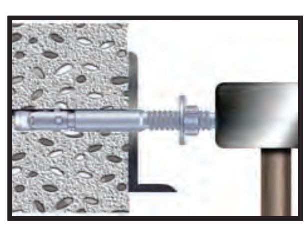
[1] Thickness of base plate

INSTALLATION INSTRUCTIONS

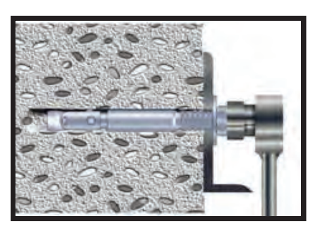
Drill hole to the proper diameter and depth



Blow out dust from the hole



Place anchor in drill hole



Apply installation torque to set anchor

STRENGTH DESIGN INFORMATION - TENSION

Characteristic	Symbol	Units	Nominal anchor diameter	
			½ inch	⅝ inch
Anchor Category	1,2 or 3	-	1	1
Embedment Depth	h_{nom}	in. (mm)	2⅞ (73)	3¾ (95)
Steel Strength in Tension (ACI 318 D.5.1)				
Specified Yield Strength (Carbon Steel)	f_{ya}	psi (N/mm^2)	75,420 (520)	75,420 (520)
Specified Yield Strength (304 and 316 Stainless Steel)	f_{ya}	psi (N/mm^2)	81,280 (560)	81,280 (560)
Specified Tensile Strength (Carbon Steel)	f_{uta}	psi (N/mm^2)	94,275 (650)	94,275 (650)
Specified Tensile Strength (304 and 316 Stainless Steel)	f_{uta}	psi (Nmm^2)	101,600 (700)	101,600 (700)
Effective Tensile Stress Area	A_{se}	in^2 (mm^2)	0.0964 (62)	0.1419 (92)
Tension Resistance of Steel (RSR TZ Carbon Steel)	N_{sa}	lbf (kN)	9080 (40.0)	13,375 (59.5)
Tension Resistance of Steel (SRS TZ 304 and 316 S.S.)	N_{sa}	lbk (kN)	9775 (43.5)	14,405 (64.1)
Strength Reduction Factor-Steel Failure[2]	Φ_{sa}	-	0.75	0.75
Concrete Breakout Strength in Tension (ACI 318 D.5.2)				
Effective Embedment Depth	h_{if}	in. (mm)	2½ (64)	3¼ (83)
Critical Edge Distance	C_{ac}	in. (mm)	$3.2h_{ef}$	$3h_{ef}$
Effectiveness Factor-Uncracked Concrete	k_{uncr}	-	24 (10)	24 (10)
Effectiveness Factor-Cracked Concrete	k_{cr}	-	17 (7)	17 (7)
Radio k_{uncr} k_{cr}	$\Psi_{c,N}$	-	1.4	1.4
Strength Reduction Factor-Concrete Breakout Failure[3]	Φ_{cb}	-	0.65	0.65
Pull-Out Strength in Tension (ACI 318 D.5.3)				
Pull-Out Resistance Cracked Concrete (f_c = 2,500 psi)[5]	$N_{pn,cr}$	lbf (kN)	2810 (12.5)	NA[4]
Pull-Out Resistance Uncracked Concrete (f_c = 2,500 psi)[5]	$N_{pn,uncr}$	lbf (kN)	4495 (20)	NA[4]
Strength reduction Factor Pullout Failure[6]	Φ_p	-	0.65	0.65
Tension Strength for Seismic Applications (ACI 318 D.3.3.3)				
Tension Resistance of Single Anchor Seis. Load (f_c=2,500 psi)[5]	$N_{pn,eq}$	lbf (kN)	2810 (12.5)	NA[4]
Strength reduction Factor Pullout Failure[6]	Φ_{eq}	-	0.65	0.65
Axial Stiffness in Service Load Range	β	-	342,620 (60)	342,620

For SI: 1inch = 25.4mm, 1lbf = 4.45N, 1 lb/in = 0.175 N/mm, 1 psi = 6.89 Pa, 1 in2 = 645 mm2, 1 lb/in = 0.175 N/mm.

[1] The information presented in this table must be used in conjunction with the design requirements of ACI 318 Appendix D.
[2] The tabulated value of Φ_{sa} applies when the load combinations of Section 1605.2.1 of the IBC, Section 1612.2.1 of the UBC, or ACI 18 9.2 are used. If the load combinations of Section 1909.2 of the UBC or ACI 318 Appendix C are used, the appropriate value of Φ_{sa} must be determined in accordance with ACI 318 D.4.5. The 1/2 inch and 5/8 inch diameter anchors are ductile steel elements as defined in ACI 318 D.1.
[3] The tabulated value of Φ_{cb} applies when both the load combinations of Section 1605.2.1 of the IBC, Section 1612.2.1 of the UBC, or ACI 318 9.2 are used and the requirements of ACI 318 D.4.4(c) for Condition B are satisfied. For installations where complying supplementary reinforcement can be verified, the Φ_{cb} factors described in ACI 318 D.4.4 for Condition A are allowed. If the load combinations of Section 1605.2.1 of the IBC, Section 1612.2.1 of the UBC, or ACI 318 9.2 are used and the requirements of ACI 318 D.4.4 for Condition A are satisfied, the appropriate value of Φ_{cb} must be determined in accordance with ACI 318 D.4.4(c). If the load combinations of ACI 318 Appendix C or Section 1902. 2 of the UBC are used, the appropriate value of Φ_{cb} must be determined in accordance with ACI 318 D.4.5.
[4] As described in Section 4.1.3 of this report, N/A (Not Applicable) denotes that pullout resistance is not critical and does not need to be considered.
[5] The characteristic pull-out resistance for greater concrete compressive strengths may be increased by multiplying the tabular value by $(f_c / 2,500)^{0.5}$.
[6] The tabulated value of Φ_p or Φ_{eq} applies when both the load combinations of Section 1605.2.1 of the IBC, Section 1612.2.1 of the UBC, or ACI 318 Section 9.2 are used and the requirements of ACI 318 D.4.4(c) for Condition B are satisfied. Condition B applies where supplementary reinforcement is not provided or where pullout strength governs. For installations where complying supplementary reinforcement can be verified, the Φ factors described in ACI 318 D.4.4 for Condition A are allowed. If the load combinations of ACI 318 Appendix C or Section 1902. 2 of the UBC are used, appropriate value of Φ must be determined in accordance with ACI 318 D.4.5.
[7] For all design cases, Ψ_{cp} = 1.0
[8] For 2006 IBC, $N_{sa} = N_s$; $A_{se} = A_s$

SRS TZ WEDGE ANCHOR

STRENGTH DESIGN INFORMATION - SHEAR

Characteristic	Symbol	Units	Nominal anchor diameter	
			½ inch	⅝ inch
Anchor Category	1,2 or 3	-	1	1
Embedment Depth	h_{nom}	in.	2⅞ (73)	3¾ (95)
Steel Strength in Shear (ACI 318 D.6.1)				
Specified Yield Strength for Shear (Carbon Steel)	f_{ya}	psi (N/mm^2)	69,620 (480)	69,620 (480)
Specified Yield Strength for Shear (304 and 316 S.S.)	f_{ya}	psi (N/mm^2)	60,960 (420)	75,470 (520)
Specified Tensile Strength for Shear (Carbon Steel)	f_{uta}	psi (N/mm^2)	87,025 (650)	87,025 (650)
Specified Tensile Strength for Shear (304 and 316 S.S.)	f_{uta}	psi (Nmm^2)	75,470 (520)	94,340 (650)
Effective Shear Stress Area	A_{se}	in^2 (mm^2)	0.142 (92)	0.226 (146)
Shear Resistance of Steel (SRS TZ Carbon Steel)	V_{sa}	lbf (kN)	7420 (33)	11,015 (49)
Shear Resistance of Steel (SRS TZ 304 and 316 S.S.)	V_{sa}	lbk (kN)	6430 (28.6)	12,0790 (56.9)
Strength Reduction Factor-Steel Failure[2]	Φ_{sa}	-	0.65	0.65
Concrete Breakout Strength in Shear (ACI 318 D.6.2)				
Nominal Diameter	d_o	in.	½ (12.7)	⅝ (15.9)
Load Bearing Length of Anchor in Shear	l_e	in.	2 ½ (64)	3 ¼ (83)
Strength Reduction Factor-Concrete Breakout Failure[3]	Φ_{cb}	-	0.7	0.7
Concrete Pryout Strength in Shear (ACI 318 D.6.3)				
Coefficient for Pryout Strength	k_{cp}	-	2	2
Strength Reduction Factor-Concrete Pryout Failure[4]	Φ_{cp}	-	0.7	0.7
Shear Strength for Seismic Applications (ACI 318 D.3.3.3)				
Shear Resistance of Single Anchor for Seismic Load (f'_c = 2,500 psi) (Carbon Steel)	$V_{sa,eq}$	lbf (kN)	5170 (23)	7645 (34)
Shear Resistance of Single Anchor for Seismic Load (f'_c = 2,500 psi) (304 and 316 Stainless Steel)	$V_{sa,eq}$	lbf (kN)	4500 (20)	8950 (39.8)
Strength Reduction Factor-Steel Failure	Φ_{eq}	-	0.65	0.65

For SI: 1inch = 25.4mm, 1 lbf = 4.45 N, 1 psi = 6.89 Pa, 1 in2 = 645 mm2.

[1]The information presented in this table must be used in conjunction with the design criteria of ACI 318 Appendix D.

[2]The tabulated value of Φ_{sa} applies when the load combinations of Section 1605.2.1 of the IBC, Section 1612.2.1 of the UBC, or ACI 318 9.2 are used and the requirements of ACI 318 D.4.4(c) for Condition B are satisfied. If the load combinations of Section 1909.2 of the UBC or ACI 318 Appendix C are used, the appropriate value of Φ_{sa} must be determined in accordance with ACI 318 D.4.5. The ½ inch and 5/8 inch diameter anchors are ductile steel elements as defined in ACI 318 D.1.1.

[3]The tabulated value of Φ_{cb} applies when both the load combinations of Section 1605.2.1 of the IBC, Section 1612.2.1 of the UBC, or ACI 318 9.2 are used and the requirements of ACI 318 D.4.4(c) for Condition B are satisfied. Condition B applies where supplementary reinforcement is not provided or where pry-out strength governs. For installations where complying supplementary reinforcement can be verified, the Φ factors described in ACI 318 D.4.4 for condition A are allowed. If the load combinations of Section 1605.2.1 of the IBC, Section 1612.2.1 of the UBC, or ACI 318 9.2 are used and the requirements of ACI 318 D.4.4 for Condition A are satisfied, the appropriate value of Φ must be determined in accordance with ACI 318 D.4.4(c). If the load combinations of ACI 318 Appendix C or Section 1909.2 of the UBC are used, the appropriate value of Φ must be determined in accordance with ACI 318 D.4.5.

[4]The tabulated value of Φ_{cp} applies when both the load combinations of Section 1605.2.1 of the IBC, Section 1612.2.1 of the UBC, or ACI 318 9.2 are used and the requirements of ACI 318 D.4.4(c) for Condition B are satisfied. Condition B applies where supplementary reinforcement is not provided or where pry-out strength governs. For installations where complying supplementary reinforcement can be verified, the Φ factors described in ACI 318 D.4.4 for Condition A are allowed. If the load combinations of ACI 318 Appendix C or Section 1909.2 of the UBC are used, the appropriate value of Φ must be determined in accordance with ACI 318 D.4.5.

[5]For 2006 IBC, $A_{se} = A_s$

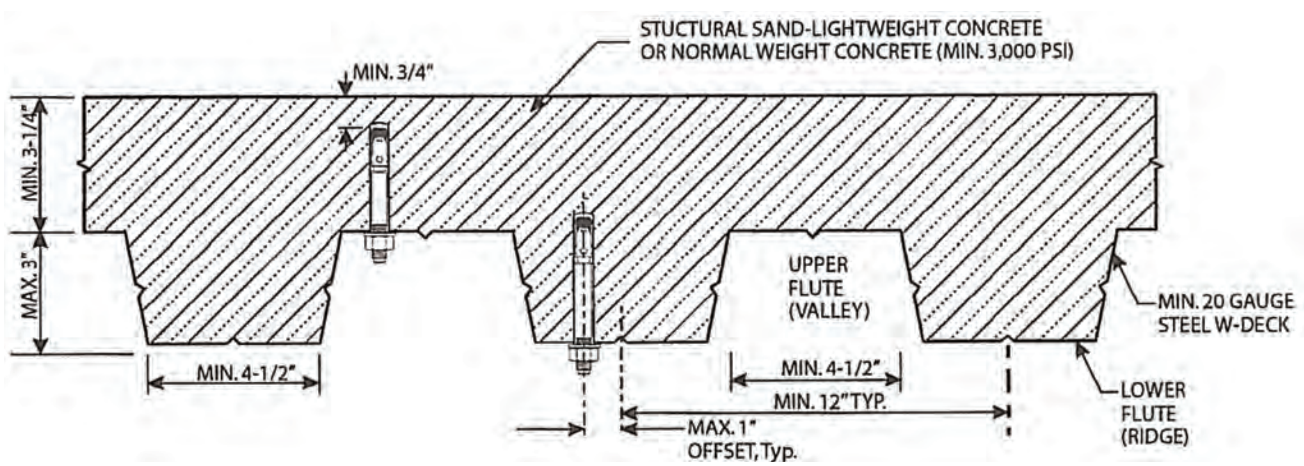
STRENGTH DESIGN INFORMATION - TENSION AND SHEAR FOR INSTALLATION IN CONCRETE OVER METAL DECK

Setting Information	Symbol	Units	Nominal anchor diameter	
			½ inch	⅝ inch
Embedment Depth	h_{nom}	in. (mm)	2 ⅞ (73)	3 ¾ (95)
Effective Embedment Depth	h_{ef}	in. (mm)	2½ (64)	3¼ (83)
Installation Torque	T_{inst}	ft-lbf (Nm)	35 (47.5)	65 (90)
Pull-Out Resistance Cracked Concrete [3]	$N_{pn,deck,cr}$	lbf (kN)	1460 (6.5)	2730 (12,1)
Pull-Out Resistance Uncracked Concrete [4]	$N_{pn,deck,uncr}$	lbf (kN)	2335 (10.4)	3855 (17.2)
Steel Strength in Shear [5]	$V_{sa,deck}$	lbf (kN)	2785 (12.4)	4410 (19.6)

For SI: 1 inch = 25.4mm, 1 ft-lbf = 1.356 N-m, 1 lbf = 4.45 N.

[1] Installation must comply with Section 4.3 and Figure 4. Except as specifically noted, all installations must be into the lower flute of the deck.
[2] Profile steel deck must comply with Figure 4 and have a minimum base steel thickness of 0.034 inch. Steel must comply with ASTM A653 / A635M, with minimum yield strength of 40 ksi (275 MPa).
[3] The values must be used in accordance with Section 4.1.3 and 4.1.8 of this report.
[4] The values must be used in accordance with Section 4.1.3 and of this report.
[5] The values must be used in accordance with Section 4.1.4 and 4.1.8 of this report.
[6] The minimum anchor spacing along the flute must be the greater of 3.0 hef or 1.5 times the flute width.

INSTALLATION IN THE SOFFIT OF CONCRETE OVER METAL DECK



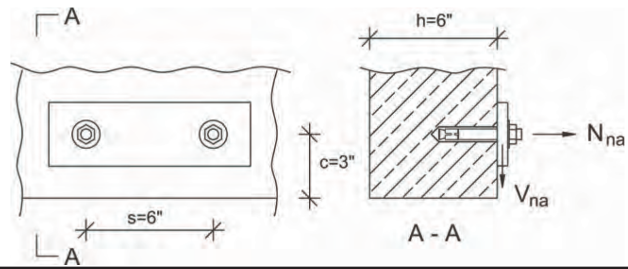
LENGTH IDENTIFICATION SYSTEM (CARBON STEEL AND STAINLESS STEEL ANCHORS)

Length ID marking on stud	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**	**S**	**T**
Length of anchor min ≥ (in.)	2½	3	3½	4	4½	5	5½	6	6½	7	7½	8	8½	9	9½	10	11	12
Length of anchor max < (in.)	3	3½	4	4½	5	5½	6	6½	7	7½	8	8½	9	9½	10	11	12	13

SRS TZ WEDGE ANCHOR

SRS TZ WEDGE ANCHOR SAMPLE CALCULATIONS

Determine if two ½ inch diameter SRS TZ carbon steel anchors with an effective embedment depth hef = 2½ inches installed 6 inches from center to center and 3 inches from the edge of a 6 inch deep slab is adequate for a service tension load of 2,000 lb. for wind and a reversible service shear load of 400 lb. for wind. The anchor group will be in the tension zone, away from other anchors in f'c = 3,000 psi normal – weight concrete



	ACI318-08 Code Ref.	Report Ref.

1. Verify minimum Member Thickness, Spacing and Edge Distance:

   h = 6 in. ≥ hmi n = 5 in. o.k.
   s = 6 in. ≥ smin = 6 in. o.k.
   c_a, min = 3 in. ≥ c_{min} = 3 in. o.k.

2. Determine the Factored Tension and Shear Design Loads: 9.2.1

   N_{ua} = 1.6 W = 1.6 x 2,000 = 3,200 lb.
   V_{ua} = 1.6 W = 1.6 x 400 = 640 lb.

3. Steel Capacity under Tension Loading: D.5.1

   Nsa = 9,08 0
   Φ = 0.75
   n = 2 (double anchor group)
   Calculating for Φ Nsa :
   Φ Nsa = 0.75 x 2 x 9,080 = 13,620 lb.

4. Concrete Breakout Capacity under Tension Loading D.5.2

   $N_{cbg} = \frac{A_{Nc}}{A_{Nco}} \Psi_{ec,N} \Psi_{ed,N} \Psi_{c,N} \Psi_{cp,N} N_b$ Eq.(D-5)

   where:

   $N = K\sqrt{f'_c} h_{ef}^{1.5}$ Eq.(D-7)

   with $K_c = K_{cr} = 17$

   $\Psi_{ec,N}$ = 1.0 since eccentrically e_N= 0 Eq.(D-9)

   $\Psi_{ed,N} = 0.7 + 0.3 \frac{C_{a,min}}{1.5h_{ef}}$ when $C_{a,min} \leq 1.5h_{ef}$ Eq.(D-11)

   by observation $C_{a,min} = 3 < 1.5h_{ef}$ = 3.75in.

   $\Psi_{ed,N} = 0.7 + 0.3 \frac{(3)}{1.5(2.5)} = 0.94$

   $\Psi_{c,N}$ = 1.0 assuming cracking at service loads ($f_t > f_r$) D.5.2.6

   $\Psi_{cp,N}$= 1.0 designed for cracked concrete D.5.2.7

	ACI318-08 Code Ref.	Report Ref.

calculation for $\frac{A_{Nc}}{A_{Nco}}$

$A_{Nco} = 9h_{ef}^2 = 9(2.5)^2 = 56.25\ In^2$ Eq. (D-6)

$A_{Nc} = (c_{a1} + 1.5h_{ef})\ (2 \times 1.5h_{er} + s_1)$
$= (3 + 1.5 \times 2.5)\ (2 \times 1.5 \times 2.5 + 6)$ Fig. RD.5.2.1 b
$= 91.1 in.^2$

$\frac{A_{Nc}}{A_{Nco}} = \frac{91.1}{56.25} = 1.62$

Calculation for N_b and N_{cbg}:

$N_b = 17 \times \sqrt{3,000} \times (2.5)1.5 = 3,681$ lb.

$N_{cbg} = 1.62 \times 1.0 \times 0.94 \times 1.0 \times 1.0 \times 3,681 = 5,605$ lb.

Φ = 0.65 for Condition B
(no supplementary reinforcement provided)

$\Phi N_{cb} = 0.65 \times 5,605 = 3,643$

5. Pullout Capacity D.5.3

   $N_{pn,cr} = 2 \times 2,810 \times \left(\frac{3,000}{2,500}\right)^{0,5} = 6,156$ lb.

   Φ = 0.65

   $\Phi N_{pn,cr} = 0.65 \times 6,156 = 4,002$ lb.

6. Check all Failure Modes under Tension Loading: D.4.1.2

   Summary:

Steel Capacity	= 13,620 lb.
Concrete Breakout Capacity	= 3,643 lb. ← **Controls**
Pullout Capacity	= 4,002 lb.

   Φ N_n = 3,643 lb. as Concrete Breakout Capacity Controls > N_{ua} = 3,200 lb. - OK

7. Steel Capacity under Shear Loading: D.6.1

   Calculating for ΦV_{sa}:

   $V_{sa} = 2 \times 7,420 = 14,840$ lb.

   Φ = 0.65 Φ = 0.65

   $\Phi V_{sa} = 0.65 \times 14,840 = 9,646$ lb.

ACI318-08 Code Ref. | Report Ref.

8. Concrete Breakout Capacity under Shear Loading: D.6.2

$$V_{cbg} = \frac{A_{Vc}}{A_{Vco}} \Psi_{ec,V}\, \Psi_{ed,V}\, \Psi_{c,V}\, V_b \qquad \text{Eq.(D-22)}$$

where:

$$V_b = 7\left(\frac{l_e}{d_o}\right)^{0.2} \sqrt{d_o}\, \sqrt{f'_c}\, c_{a1}^{1.5} \qquad \text{Eq. (D-24)}$$

$\Psi_{ec,V}$ = 1.0 since eccentricity $e'_V = 0$ — Eq.(D-26)

$\Psi_{ed,V}$ = 1.0 since $c_{a2} > 1.5c_{a1}$ — Eq.(D-27)

$\Psi_{c,V}$ = 1.0 assuming cracking at service loads ($f_t > f_r$) — D.6.2.7

calculating for $\frac{A_{Vc}}{A_{Vc0}}$

$h = 6 > 1.5\ c_{a1} = 1.5 \times 3 = 4.5$in.

$A_{Vc} = (2(1.5c_{a1}) + s_1)\ 1.5c_{a1}$ — Fig. RD.6.2.1b

$= (2 \times 1.5 \times 3 + 6) \times 1.5 \times 3$

$= 67.5$ in.^{2}

$A_{Vc0} = 4.5\ (c_{a1})^2 = 4.5 \times 3^2 = 40.5$in.^{2} — Eq.(D-23)

$\frac{A_{Vc}}{A_{Vc0}} = \frac{67.5}{40.5} = 1.67$ — D.6.2.1

calculating for V_b and $\Phi\ V_{cbg}$

$d_o = 0.5$ in.

$l_e = h_{ef} = 2.5$ in. — D.6.2.2

$c_{a1} = 3$ in.

$\Phi = 0.70$ for Condition B

(no supplementary reinforcement provided)

$$Vb = 7 \times \left(\frac{2.5}{0.5}\right)^{0.2} \times \sqrt{0.5} \times \sqrt{3{,}000} \times (3)^{1.5} = 1{,}944 \text{ lb.}$$

$$\Phi V_{cbg} = 0.70 \times 1.67 \times 1.0 \times 1.0 \times 1.0 \times 1{,}944 = 2{,}272 \text{ lb.}$$

9. Concrete Pryout Strength: D.6.3

Vcpg = kcp Ncbg — Eq.(D-30)

Where:
$\Phi = 0.70$
kcp = 2.0 — D.6.3.1

Vcpg = kcpNcbg = 2.0 x 5,605 = 11,210 lb — Eq.(D-30)

Φ Vcpg = 0.70 x 11,210 = 7,847 lb.

ACI318-08 Code Ref. | Report Ref.

10. Check all Failure Modes under Shear Loading: D.4.1.2

Summary:
Steel Capacity = 9,645 lb.
Concrete Breakout Capacity = 2,272 lb. ← **Controls**
Pryout Capacity = 7,847 lb.

$\Phi\ V_n$ = 2,272 lb. as Concrete Breakout Capacity controls $> V_{ua}$ = 640 lb. - OK

11. Check Interaction of Tension and Shear Forces D.7

If $0.2\ \Phi\ V_n \geq V_{ua}$ then the full tension design strength is permitted. — D.7.1
By observation, this is not the case.

If $0.2\ \Phi\ N_n \geq N_{ua}$ then the full tension design strength is permitted. — D.7.2
By observation, this is not the case.

Therefore:

$$\frac{N_{ua}}{\Phi N_n} + \frac{V_{ua}}{\Phi V_n} \geq 1.2$$

$$\frac{3{,}200}{3{,}643} + \frac{640}{2{,}272} = 0.88 + 0.28 = 1.16 < 1.2 \text{ - OK}$$

12. Summary

Two 1/2 in. diameter SRS TZ at 2 1/2 in. effective depth are adequate to resist the applied service tension and shear loads of 2,000 and 400 lb., respectively.