

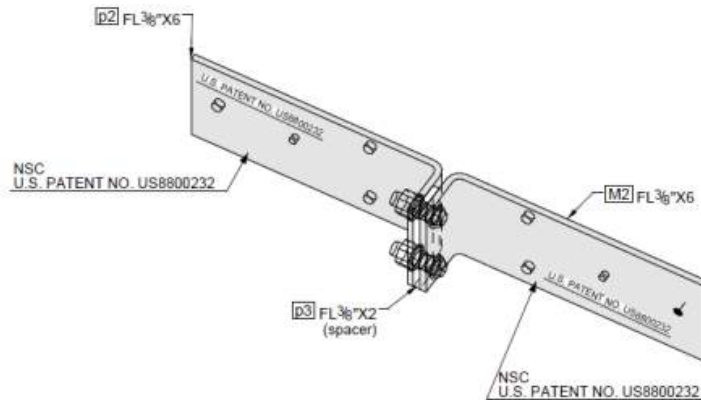
DTFC - Anchorage Data

Calculation Report for
DTFC - Anchorage

Prepared for

Calculation Report
Date of Completion: Sep 17, 2025
Prepared by:

Project Id





SIMPSON STRONG-TIE COMPANY INC.
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NOTE:

The following data tables are based on example anchorage design calculations where one side of the double-tee connection is considered (see "Example Calculations - DTFC"). For the vertical/out-of-plane calculations, per PCI Design Handbook 7th Edition the vertical is distributed between the two adjacent double tees. Please contact Northford Structural Connections for additional information regarding the loading data and calculation methods used.

AT-3G™ High-Strength Hybrid Acrylic Adhesive Anchor System for DTFC - Northford Structural Connections
Tension and Shear Strength Design Data for 1/2-in Diameter Threaded Rods in
Precast Double Tee beam flanges ($f'_c = 5,000$ psi)



Double Tee Thickness h_{min} (in)	Adhesive Anchor System	Anchor Diameter d_a (in)	Threaded Rod Type(s)	Embedment Depth (in) h_{ef} (in)	Maximum Horizontal Shear Load Only, Parallel to Joint ϕV_n (lbs)	Combined Shear Load Normal and Shear Load Parallel to Joint		Maximum Vertical Shear Load Only, Perpendicular to Joint ϕN_n (lbs)
						ϕV_{nL} (lbs)	ϕV_{nH} (lbs)	
4	AT-3G	1/2	F1554 Grade 36, 55, or 105 A193 Grade B7 A193 Grade B8/B8M, Type 304/316 SS F593 CW, Type 304/316 SS	2 3/4	3,515	1,500	3,230	2,156
4.5	AT-3G	1/2	F1554 Grade 36, 55, or 105 A193 Grade B7 A193 Grade B8/B8M, Type 304/316 SS F593 CW, Type 304/316 SS	3 1/4	4,150	1,500	3,885	2,550
5	AT-3G	1/2	F1554 Grade 36	3 3/4	4,355	1,500	4,085	2,945
5	AT-3G	1/2	F1554 Grade 55 or 105 A193 Grade B7 A193 Grade B8/B8M, Type 304/316 SS F593 CW, Type 304/316 SS	3 3/4	4,800	1,500	4,525	2,945

Strong-Bolt® 2 Wedge Anchor for DTFC by Northford Structural Connections - Temporary Erection Anchor
Precast Double Tee beam flange ($f'_c = 5,000$ psi)





Size (in)	Coating/Material	Nominal Diameter d_a (in)	Drill Bit Diameter d (in)	DTFC Fixture Hole Diameter d_c (in)	Installation Torque T_{inst} (ft-lbf)	Nominal Embedment Depth h_{nom} (in)	Minimum Hole Depth h_{hole} (in)	Minimum Overall Anchor Length l_{anch} (in)	Minimum Double Tee Thickness h (in)	Model No. h (in)
1/4 x 2 1/4	Zinc-Plated/Carbon Steel Type 304 Stainless Steel Type 316 Stainless Steel	1/4	1/4	5/16	4	1 3/4	1 7/8	2 1/4	3 1/4	STB2-25214F100 STB2-25214S4F100 STB2-25214S6F100

Titen Turbo™ Concrete and Masonry Screw Anchor for DTFC by Northford Structural Connections - Temporary Erection Anchor
Precast Double Tee beam flange ($f'_c = 5,000$ psi)



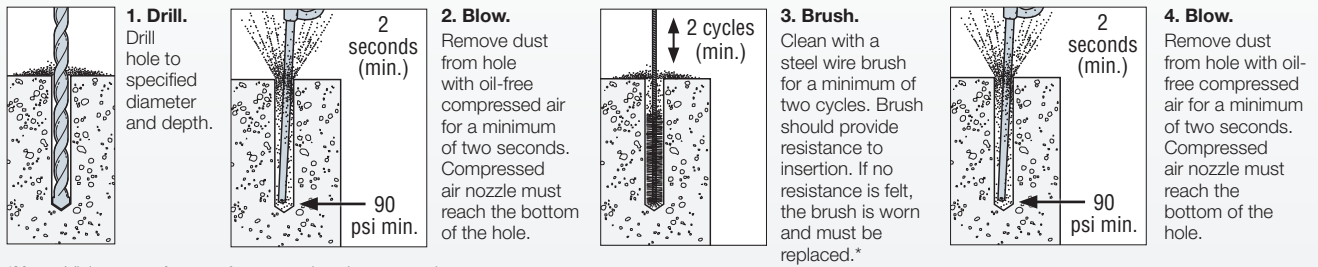
Size (in)	Coating/Material	Nominal Diameter d_a (in)	Drill Bit Diameter d (in)	DTFC Fixture Hole Diameter d_c (in)	Head Type	Nominal Embedment Depth h_{nom} (in)	Minimum Hole Depth h_{hole} (in)	Minimum Overall Anchor Length l_{anch} (in)	Minimum Double Tee Thickness h (in)	Model No.(Color) h (in)
1/4 x 2 1/4	Zinc-Plated with Ceramic Coating Carbon Steel	1/4	3/16	5/16	Hex Head	1 3/4	2 1/4	2 1/4	3 1/4	TNT25214H (Blue) TNTBL25234H (Black)

Adhesive Anchoring Installation Instructions

-  **NOTE:** Always check expiration date on product label. Do not use expired product.
 - For best results, adhesive should be conditioned to a temperature between 70°F (21°C) and 80°F (37°C) at the time of installation.
 - To warm cold adhesive, store cartridges in a warm, uniformly heated area or storage container. Do not immerse cartridges in water or use microwave to facilitate warming.
-  **WARNING:** When drilling and cleaning hole, use eye and lung protection. When installing adhesive, use eye and skin protection.

NOTE:
These modified instructions are for DTFC fixture installations in an overhead application. Refer to strongtie.com, C-A-2023, and ICC-ES Evaluation Report ESR-5026.

1A Hole Preparation — Horizontal, Vertical and Overhead Applications (SET-3G™ and AT-3G™ for anchor installation) and (AT-3G for post-installed rebar connections)



*Note: Visit strongtie.com for proper brush part number.

1B Hole Preparation Vacuum Dust Extraction Systems

*Note: Visit strongtie.com for tested and accepted hollow carbide drill bit and vacuum dust extraction systems.

Dust Extraction Drill Bit Systems Engineering Letters

L-A-DVBSUB25:

Installation of AT-3G™ High-Strength Hybrid Acrylic Adhesive Anchors, ET-3G™ Epoxy Adhesive Anchors and SET-3G™ High-Strength Epoxy Adhesive Anchors into holes drilled with Diablo AMPED™ Rebar Demon™ Dust Extraction Drill Bits

L-A-CVDBSUB25:

Installation of SET-3G™, SET-XP® and ET-3G™ Epoxy Adhesive Anchors, and AT-3G™ Hybrid Acrylic Adhesive Anchors, in holes drilled with Dewalt®, Hilti, Makita® and Milwaukee® Vacuum-Drill Bit Systems



Refer to strongtie.com for proper mixing nozzle and dispensing tool part number.

Installation instructions continued on p. 4 

Adhesive Anchoring Installation Instructions

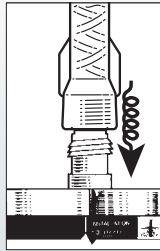
2 Cartridge Preparation

1. Check.

Check expiration date on product label.
Do not use expired product.

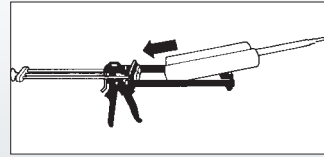
2. Open.

Open cartridge per package instructions.



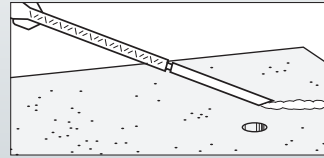
3. Attach.

Attach proper Simpson Strong-Tie nozzle and extension to cartridge. Do not modify nozzle.



4. Insert.

Insert cartridge into dispensing tool.

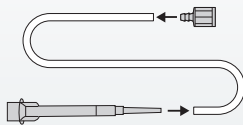


5. Dispense.

Dispense adhesive to the side until properly mixed (uniform color).

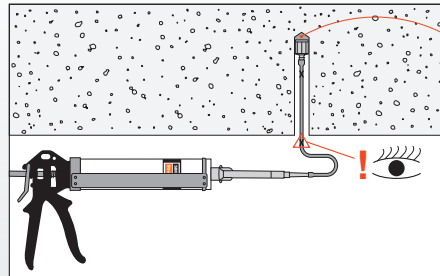
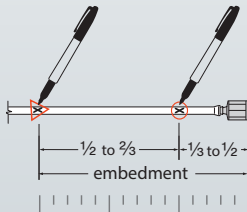
3B Filling the Hole — Horizontal and Overhead Anchorage

Prepare the hole per “Hole Preparation” instructions on product label.



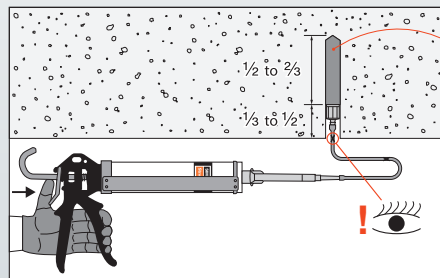
Step 1:

- Attach the piston plug to one end of the flexible tubing (PPFT25).
- Cut tubing to the length needed for the application, mark tubing as noted below and attach other end of tubing to the mixing nozzle.
- If using a pneumatic dispensing tool, regulate air pressure to 80–100 psi.



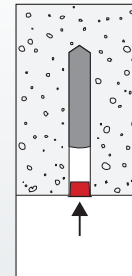
Step 2:

- Insert the piston plug to the back of the drilled hole and dispense adhesive.



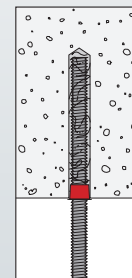
Step 3:

- Fill the hole 1/2 to 2/3 full.
- **Note:** As adhesive is dispensed into the drilled hole, the piston plug will slowly displace out of the hole due to back pressure, preventing air gaps.



Step 4:

- Install the appropriate Simpson Strong-Tie adhesive retaining cap.



Step 5:

- Place either threaded rod or rebar through the adhesive retaining cap and into adhesive-filled hole.
- Turn rod/rebar slowly until the insert bottoms out.
- Do not disturb until fully cured.

Table A — Installation Details for Threaded Rod Anchors

Anchor Diameter (in.)	Drill Bit Diameter ^{1,2} (in.)	Wire Brush Part Number	T-Handle Part Number ³	Handle Extension Part Number ⁴	Nozzle Part Number	Dispensing Tool Part Number	Adhesive Retaining Cap Part Number ⁵	Adhesive Tubing Part Number ⁵	Adhesive Piston Plug Part Number ⁵
3/8	7/16	ETB43S	ETBS-TH	ETBS-EXT	AMN190	CDT10S, ATD813S, ADT30S, ADTA30CKT, ADTA30P	ARC37A-RP25	PPFT25	Not Available ⁶
1/2	9/16	ETB56S					ARC50A-RP25		PP56-RP10
5/8	1 1/16	ETB68S					ARC62A-RP25		PP68-RP10
3/4	7/8	ETB87S					ARC75-RP25		PP87-RP10
7/8	1	ETB100S					ARC87-RP25		PP100-RP10
1	1 1/8	ETB112S					ARC100-RP25		PP112-RP10
1 1/4	1 3/8	ETB137S					ARC125-RP25		PP137-RP10

1. A rotary hammer must be used to drill all holes.
 2. Drill bits must meet the requirements of ANSI B212.15.
 3. Wire brush must be assembled with T-handle for proper usage.
 4. Extension is used with T-handle for holes exceeding 12" deep.
 5. Adhesive retaining caps, adhesive piston plugs, and tubing are to be used for horizontal and overhead anchor installations.

NOTE:
Table A from ICC-ES Evaluation Report ESR-5026

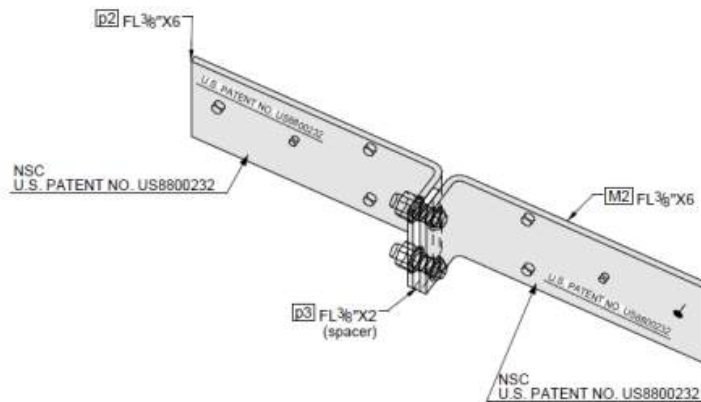
Example Calculations - DTFC

Calculation Report for
DTFC - Anchorage

Prepared for

Calculation Report
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1. Project information

Project description:
Location:
Design name: 5" Th. - AT-3G Gr 36 Comb Shear Loads Example

Comment: Combined Shear load Perpendicular and Parallel to Joint Condition

2. Input Data & Anchor Parameters

General

Design method: ACI 318-19
Units: Imperial units

Anchor Information:

Anchor type: Bonded anchor
Material: F1554 Grade 36
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 2.750
Code report: ESR-5026
Anchor category: -
Anchor ductility: Yes
 h_{min} (inch): 4.00
 C_{ac} (inch): 5.98
 C_{min} (inch): 1.75
 S_{min} (inch): 2.50

Base Material

Concrete: Normal-weight
Concrete thickness, h (inch): 5.00
State: Cracked
Compressive strength, f'_c (psi): 5000
 $\Psi_{c,v}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental edge reinforcement: Not applicable
Reinforcement provided at corners: No
Ignore concrete breakout in tension: No
Ignore concrete breakout in shear: No
Hole condition: Dry concrete
Inspection: Periodic
Temperature range, Short/Long: 150/110°F
Reduced installation torque (for AT-3G): No
Ignore 6do requirement: Not applicable
Build-up grout pad: No

Base Plate

Length x Width x Thickness (inch): 6.00 x 15.00 x 0.38

Recommended Anchor

Anchor Name: AT-3G™ - AT-3G w/ 1/2"Ø F1554 Gr. 36
Code Report: ESR-5026



AT-3G™ High-Strength Hybrid Acrylic Adhesive Anchor System for DTFC - Northford Structural Connections
Tension and Shear Strength Design Data for 1/2-in Diameter Threaded Rods in
Precast Double Tee beam flanges ($f'_c = 5,000$ psi)



Double Tee Thickness h_{min} (in)	Adhesive Anchor System	Anchor Diameter d_a (in)	Threaded Rod Type(s)	Embedment Depth (in) h_{ef} (in)	Maximum Horizontal Shear Load Only, Parallel to Joint ϕV_n (lbs)	Combined Shear Load Normal and Shear Load Parallel to Joint		Maximum Vertical Shear Load Only, Perpendicular to Joint ϕN_n (lbs)
						ϕV_{nL} (lbs)	ϕV_{nII} (lbs)	
4	AT-3G	1/2	F1554 Grade 36, 55, or 105 A193 Grade B7 A193 Grade B8/B8M, Type 304/316 SS F593 CW, Type 304/316 SS	2 3/4	3,515	1,500	3,230	2,156
4.5	AT-3G	1/2	F1554 Grade 36, 55, or 105 A193 Grade B7 A193 Grade B8/B8M, Type 304/316 SS F593 CW, Type 304/316 SS	3 1/4	4,150	1,500	3,885	2,550
5	AT-3G	1/2	F1554 Grade 36	3 3/4	4,355	1,500	4,085	2,945
5	AT-3G	1/2	F1554 Grade 55 or 105 A193 Grade B7 A193 Grade B8/B8M, Type 304/316 SS F593 CW, Type 304/316 SS	3 3/4	4,800	1,500	4,525	2,945

Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility.



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Load and Geometry

Load factor source: ACI 318 Section 5.3

Load combination: not set

Seismic design: No

Anchors subjected to sustained tension: No

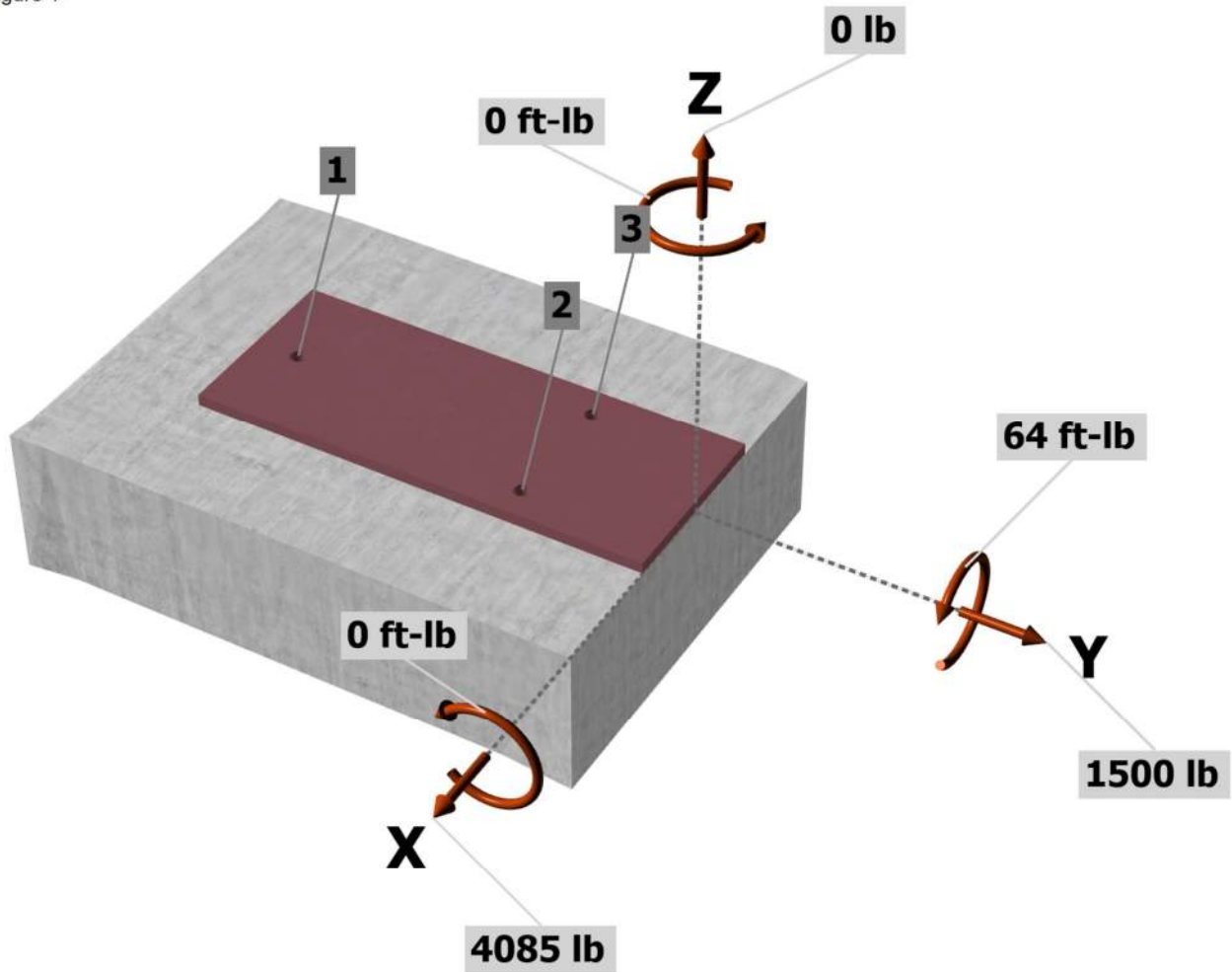
Apply entire shear load at front row: No

Anchors only resisting wind and/or seismic loads: No

Strength level loads:

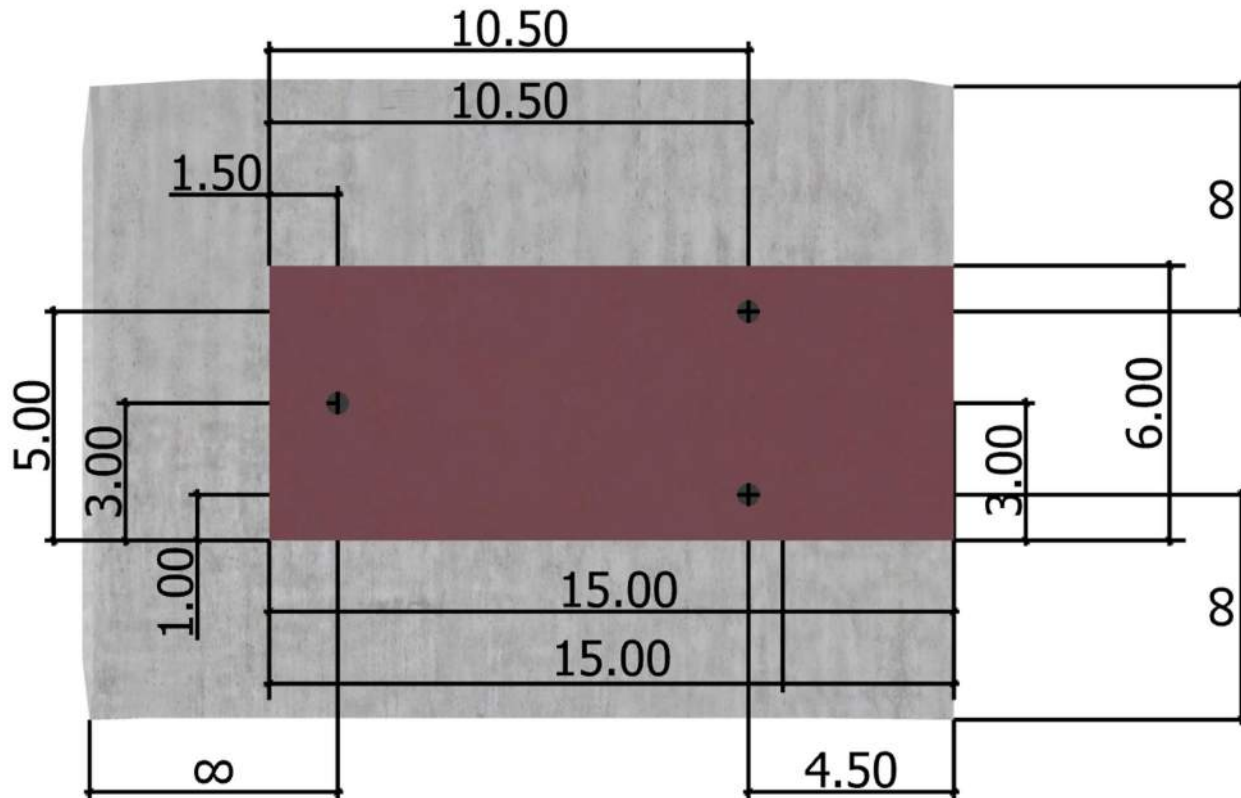
N_{ua} [lb]: 0
 V_{uax} [lb]: 4085
 V_{uay} [lb]: 1500
 M_{ux} [ft-lb]: 0
 M_{uy} [ft-lb]: 64
 M_{uz} [ft-lb]: 0

<Figure 1>



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<Figure 2>



3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2 + (V_{uay})^2}$ (lb)
1	64.5	-1603.3	500.0	1679.4
2	2.4	2844.1	-488.3	2885.7
3	126.5	2844.1	1488.3	3210.0
Sum	193.4	4085.0	1500.0	7775.2

Maximum concrete compression strain (%): 0.01
 Maximum concrete compression stress (psi): 28
 Resultant tension force (lb): 193
 Resultant compression force (lb): 193
 Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
 Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 1.28
 Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 6.61
 Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 2.43

<Figure 3>





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4. Steel Strength of Anchor in Tension (Sec. 17.6.1)

N_{sa} (lb)	ϕ	ϕN_{sa} (lb)
8230	0.75	6173

5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.6.2)

$N_b = k_c \lambda_a \sqrt{f_c} h_{ef}^{1.5}$ (Eq. 17.6.2.2.1)

k_c	λ_a	f_c (psi)	h_{ef} (in)	N_b (lb)
17.0	1.00	5000	2.750	5482

$\phi N_{cbg} = \phi (A_{Nc} / A_{Nco}) \psi_{ec,N} \psi_{ed,N} \psi_{c,N} \psi_{cp,N} N_b$ (Sec. 17.5.1.2 & Eq. 17.6.2.1a)

A_{Nc} (in ²)	A_{Nco} (in ²)	$c_{a,min}$ (in)	$\psi_{ec,N}$	$\psi_{ed,N}$	$\psi_{c,N}$	$\psi_{cp,N}$	N_b (lb)	ϕ	ϕN_{cbg} (lb)
169.13	68.06	4.50	0.763	1.000	1.00	1.000	5482	0.65	6754

6. Adhesive Strength of Anchor in Tension (Sec. 17.6.5)

$\tau_{k,cr} = \tau_{k,cr,short-term} K_{sat} (f_c / 2,500)^n$

$\tau_{k,cr}$ (psi)	$f_{short-term}$	K_{sat}	f_c (psi)	n	$\tau_{k,cr}$ (psi)
1040	1.00	1.00	5000	0.10	1115

$N_{ba} = \lambda_a \tau_{cr} \pi d_a h_{ef}$ (Eq. 17.6.5.2.1)

λ_a	τ_{cr} (psi)	d_a (in)	h_{ef} (in)	N_{ba} (lb)
1.00	1115	0.50	2.750	4815

$\phi N_{ag} = \phi (A_{Na} / A_{Na0}) \psi_{ec,Na} \psi_{ed,Na} \psi_{cp,Na} N_{ba}$ (Sec. 17.5.1.2 & Eq. 17.6.5.1b)

A_{Na} (in ²)	A_{Na0} (in ²)	c_{Na} (in)	$c_{a,min}$ (in)	$\psi_{ec,Na}$	$\psi_{ed,Na}$	$\psi_{cp,Na}$	N_{ba} (lb)	ϕ	ϕN_{ag} (lb)
373.42	235.30	7.67	4.50	0.857	0.876	1.000	4815	0.65	3727

7. Steel Strength of Anchor in Shear (Sec. 17.7.1)

V_{sa} (lb)	ϕ_{grout}	ϕ	$\phi_{grout} \phi V_{sa}$ (lb)
4940	1.0	0.65	3211

8. Concrete Breakout Strength of Anchor in Shear (Sec. 17.7.2)

Shear perpendicular to edge in y-direction:

$V_{by} = \min[7(l_e / d_a)^{0.2} \sqrt{d_a} \lambda_a \sqrt{f_c} c_{at}^{1.5}; 9 \lambda_a \sqrt{f_c} c_{at}^{1.5}]$ (Eq. 17.7.2.2.1a & Eq. 17.7.2.2.1b)

l_e (in)	d_a (in)	λ_a	f_c (psi)	c_{at} (in)	V_{by} (lb)
2.75	0.500	1.00	5000	4.50	4699

$\phi V_{cbgy} = \phi (A_{Vc} / A_{Vco}) \psi_{ec,V} \psi_{ed,V} \psi_{c,V} \psi_{h,V} V_{by}$ (Sec. 17.5.1.2 & Eq. 17.7.2.1b)

A_{Vc} (in ²)	A_{Vco} (in ²)	$\psi_{ec,V}$	$\psi_{ed,V}$	$\psi_{c,V}$	$\psi_{h,V}$	V_{by} (lb)	ϕ	ϕV_{cbgy} (lb)
67.50	91.13	1.000	1.000	1.000	1.162	4699	0.70	2831

Shear parallel to edge in y-direction:

$V_{bx} = \min[7(l_e / d_a)^{0.2} \sqrt{d_a} \lambda_a \sqrt{f_c} c_{at}^{1.5}; 9 \lambda_a \sqrt{f_c} c_{at}^{1.5}]$ (Eq. 17.7.2.2.1a & Eq. 17.7.2.2.1b)

l_e (in)	d_a (in)	λ_a	f_c (psi)	c_{at} (in)	V_{bx} (lb)
2.75	0.500	1.00	5000	4.50	4699

$\phi V_{cbgx} = \phi (2)(A_{Vc} / A_{Vco}) \psi_{ec,V} \psi_{ed,V} \psi_{c,V} \psi_{h,V} V_{bx}$ (Sec. 17.5.1.2, 17.7.2.1(c) & Eq. 17.7.2.1b)

A_{Vc} (in ²)	A_{Vco} (in ²)	$\psi_{ec,V}$	$\psi_{ed,V}$	$\psi_{c,V}$	$\psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cbgx} (lb)
87.50	91.13	1.000	1.000	1.000	1.162	4699	0.70	7339

9. Concrete Pryout Strength of Anchor in Shear (Sec. 17.7.3)

$\phi V_{cp} = \phi \min[k_{cp} N_a; k_{cp} N_{cb}] = \phi \min[k_{cp} (A_{Na} / A_{Na0}) \psi_{ed,Na} \psi_{cp,Na} N_{ba}; k_{cp} (A_{Nc} / A_{Nco}) \psi_{ed,N} \psi_{c,N} \psi_{cp,N} N_b]$ (Sec. 17.5.1.2 & Eq. 17.7.3.1a)

k_{cp}	A_{Na} (in ²)	A_{Na0} (in ²)	$\psi_{ed,Na}$	$\psi_{cp,Na}$	N_{ba} (lb)	N_a (lb)
2.0	95.74	219.55	0.882	1.000	4815	1852

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A_{Nc} (in ²)	A_{Nco} (in ²)	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	N_{cb} (lb)	ϕ	ϕV_{cp} (lb)
50.53	68.06	1.000	1.000	1.000	5482	4070	0.70	2593

10. Results

Interaction of Tensile and Shear Forces (Sec. 17.8)

Tension	Factored Load, N_{ua} (lb)	Design Strength, ϕN_n (lb)	Ratio	Status	
Steel	126	6173	0.02	Pass	
Concrete breakout	193	6754	0.03	Pass	
Adhesive	193	3727	0.05	Pass (Governs)	
Shear	Factored Load, V_{ua} (lb)	Design Strength, ϕV_n (lb)	Ratio	Status	
Steel	3210	3211	1.00	Pass	
T Concrete breakout y+	1988	2831	0.70	Pass	
Concrete breakout y+	5688	7339	0.78	Pass	
Pryout	3210	2593	1.24	Fail (Governs)	
Interaction check	$N_{ua}/\phi N_n$	$V_{ua}/\phi V_n$	Utilization Ratio	Permissible	Status
Sec. 17.8.3	0.05	1.24	107.5%	1.0	Fail

FAIL! Selected anchor type and embedment do not meet the selected design criteria.

11. Warnings

- For irregular anchor patterns, the designer must consider sizing of base plate holes to ensure shear loads are distributed to anchors as designed.
- Designer must exercise own judgement to determine if this design is suitable.
- Refer to manufacturer's product literature for hole cleaning and installation instructions.

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1. Project information

Project description:
 Location:
 Design name: 4" Th. - STB2 SS Erection Anchorage Example

Comment: Erection Anchorage Example Calc

2. Input Data & Anchor Parameters

General

Design method: ACI 318-19
 Units: Imperial units

Anchor Information:

Anchor type: Torque controlled expansion anchor
 Material: Stainless Steel
 Diameter (inch): 0.250
 Nominal Embedment depth (inch): 1.750
 Effective Embedment depth, h_{ef} (inch): 1.500
 Code report: ICC-ES ESR-3037
 Anchor category: 1
 Anchor ductility: Yes
 h_{min} (inch): 3.25
 c_{ac} (inch): 2.50
 c_{min} (inch): 1.75
 s_{min} (inch): 2.25

Base Material

Concrete: Normal-weight
 Concrete thickness, h (inch): 6.00
 State: Uncracked
 Compressive strength, f'_c (psi): 5000
 Reinforcement condition: B tension, B shear
 Supplemental edge reinforcement: No
 Reinforcement provided at corners: No
 Ignore concrete breakout in tension: No
 Ignore concrete breakout in shear: No
 Ignore 6do requirement: Not applicable
 Build-up grout pad: No

Base Plate

Length x Width x Thickness (inch): 6.00 x 15.00 x 0.38

Recommended Anchor

Anchor Name: Strong-Bolt® 2 Stainless Steel - 1/4"Ø STB2SS, h_{nom} : 1.75" (45mm)
 Code Report: ICC-ES ESR-3037



Strong-Bolt® 2 Wedge Anchor for DTFC by Northford Structural Connections - Temporary Erection Anchor
 Precast Double Tee beam flange ($f'_c = 5,000$ psi)



Size (in)	Coating/ Material	Nominal Diameter d_a (in)	Drill Bit Diameter d (in)	DTFC Fixture Hole Diameter d_c (in)	Installation Torque T_{inst} (ft-lbf)	Nominal Embedment Depth h_{nom} (in)	Minimum Hole Depth h_{hole} (in)	Minimum Overall Anchor Length l_{anch} (in)	Minimum Double Tee Thickness h (in)	Model No. h (in)
1/4 x 2 1/4	Zinc-Plated/Carbon Steel Type 304 Stainless Steel Type 316 Stainless Steel	1/4	1/4	5/16	4	1 3/4	1 7/8	2 1/4	3 1/4	STB2-25214F100 STB2-25214S4F100 STB2-25214S6F100

Titen Turbo™ Concrete and Masonry Screw Anchor for DTFC by Northford Structural Connections - Temporary Erection Anchor
 Precast Double Tee beam flange ($f'_c = 5,000$ psi)



Size (in)	Coating/ Material	Nominal Diameter d_a (in)	Drill Bit Diameter d (in)	DTFC Fixture Hole Diameter d_c (in)	Head Type	Nominal Embedment Depth h_{nom} (in)	Minimum Hole Depth h_{hole} (in)	Minimum Overall Anchor Length l_{anch} (in)	Minimum Double Tee Thickness h (in)	Model No. (Color) h (in)
1/4 x 2 1/4	Zinc-Plated with Ceramic Coating Carbon Steel	1/4	3/16	5/16	Hex Head	1 3/4	2 1/4	2 1/4	3 1/4	TNT25214H (Blue) TNTBL25234H (Black)



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Load and Geometry

Load factor source: ACI 318 Section 5.3

Load combination: not set

Seismic design: No

Anchors subjected to sustained tension: Not applicable

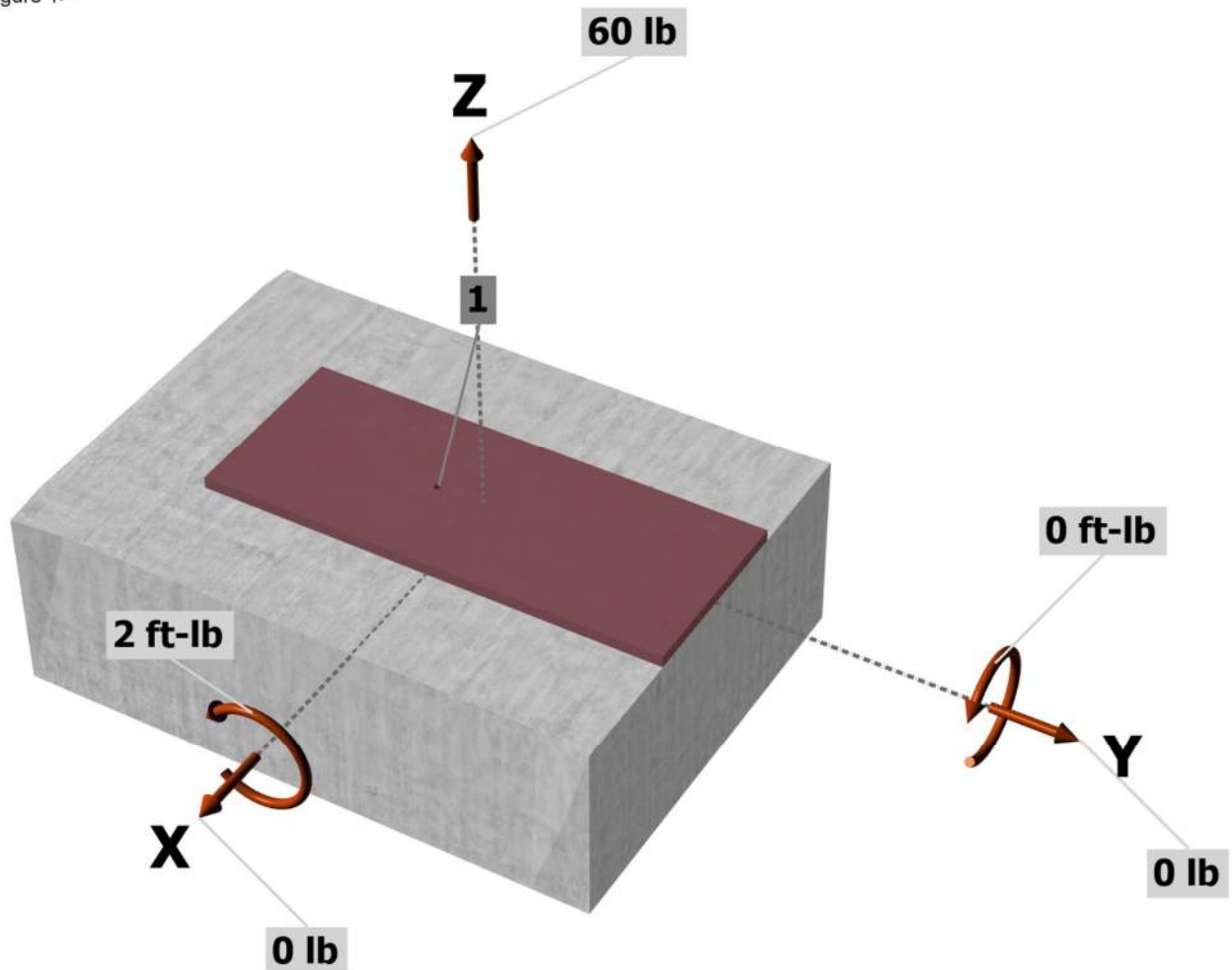
Apply entire shear load at front row: No

Anchors only resisting wind and/or seismic loads: No

Strength level loads:

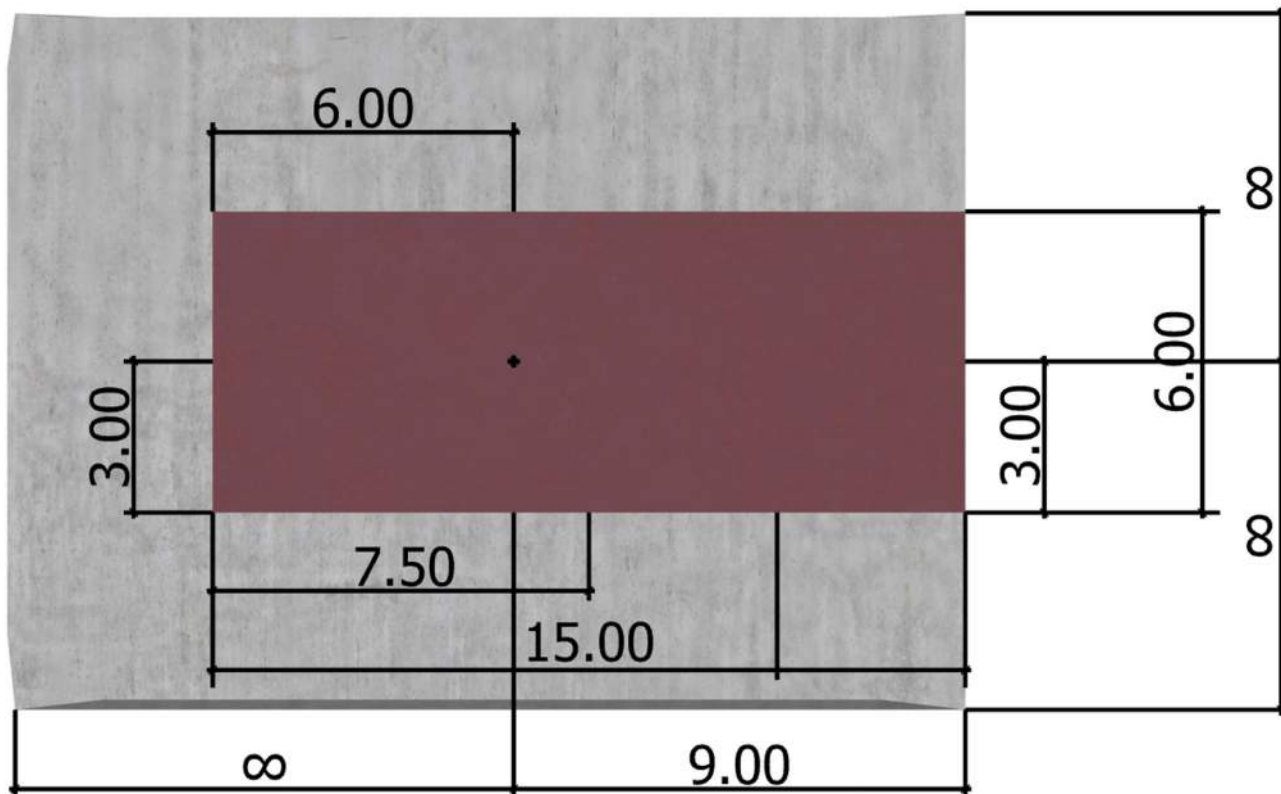
N_{ua} [lb]: 60
 V_{uax} [lb]: 0
 V_{uay} [lb]: 0
 M_{ux} [ft-lb]: 2
 M_{uy} [ft-lb]: 0

<Figure 1>



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<Figure 2>

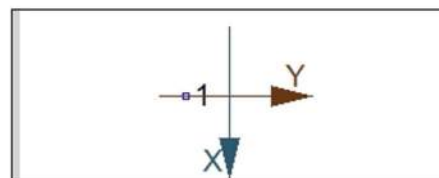


3. Resulting Anchor Forces

Anchor	Tension load, N _{ua} (lb)	Shear load x, V _{uax} (lb)	Shear load y, V _{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2 + (V_{uay})^2}$ (lb)
1	79.9	0.0	0.0	0.0
Sum	79.9	0.0	0.0	0.0

Maximum concrete compression strain (%): 0.01
 Maximum concrete compression stress (psi): 22
 Resultant tension force (lb): 80
 Resultant compression force (lb): 20
 Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
 Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00

<Figure 3>



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4. Steel Strength of Anchor in Tension (Sec. 17.6.1)

N_{sa} (lb)	ϕ	ϕN_{sa} (lb)
3060	0.75	2295

5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.6.2)

$$N_b = k_c \lambda_a \sqrt{f_c} h_{ef}^{1.5} \text{ (Eq. 17.6.2.2.1)}$$

k_c	λ_a	f_c (psi)	h_{ef} (in)	N_b (lb)
24.0	1.00	5000	1.500	3118

$$\phi N_{cb} = \phi (A_{Nc} / A_{Nco}) \psi_{ed,N} \psi_{c,N} \psi_{cp,N} N_b \text{ (Sec. 17.5.1.2 & Eq. 17.6.2.1a)}$$

A_{Nc} (in ²)	A_{Nco} (in ²)	$c_{a,min}$ (in)	$\psi_{ed,N}$	$\psi_{c,N}$	$\psi_{cp,N}$	N_b (lb)	ϕ	ϕN_{cb} (lb)
20.25	20.25	9.00	1.000	1.00	1.000	3118	0.65	2026

6. Pullout Strength of Anchor in Tension (Sec. 17.6.3)

$$\phi N_{pn} = \phi \psi_{c,P} \lambda_a N_p (f_c / 2,500)^n \text{ (Sec. 17.5.1.2, Eq. 17.6.3.1 & Code Report)}$$

$\psi_{c,P}$	λ_a	N_p (lb)	f_c (psi)	n	ϕ	ϕN_{pn} (lb)
1.0	1.00	1925	5000	0.40	0.65	1651

7. Results

Interaction of Tensile and Shear Forces (Sec. 17.8)

Tension	Factored Load, N_{ua} (lb)	Design Strength, ϕN_n (lb)	Ratio	Status
Steel	80	2295	0.03	Pass
Concrete breakout	80	2026	0.04	Pass
Pullout	80	1651	0.05	Pass (Governs)

1/4"Ø STB2SS, hnom:1.75" (45mm) meets the selected design criteria.

8. Warnings

- Designer must exercise own judgement to determine if this design is suitable.
- Refer to manufacturer's product literature for hole cleaning and installation instructions.