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ChubbyNut-6 : ACI 318 Appendix D Anchor Verification Calculations

Step 1: Identified Input Variables / Anchor Selection Summary

Concrete Design Condition:	**Cracked**		**Anchor Rod Size:**	**3/4**	**in**
Concrete Strength (pst):	**3000**		**Anchor Rod Grade:**	**A36/A307**	**in**
Embed. Depth (h_{ef}):	**7.11**	**in**	**Anchor Allow. Capacity (ASD):**	**10,520**	**lbs.**
Min. Slab Depth (T):	**8.75**	**in**	**Anchor Strength Design (LRFD):**	**15,050**	**lbs.**
Min. Slab Edge Dist. (W):	**11.43**	**in**	**Anchor Model:**	**CN6**	**(ChubbyNut-6)**
			Model Diameter:	**1.545**	**in**
			Model Lip Ht.:	**0.192**	**in**

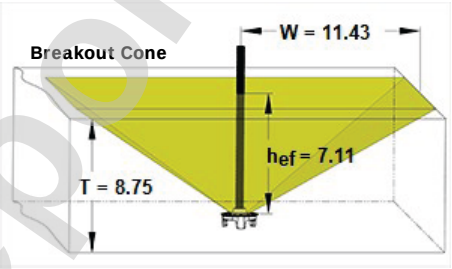
Step 2: Steel Strength of Anchor in Tension (Section D.5.1)

$N_{sa} = nA_{se}f_{uta}$ (Equation D-3)

Number of anchors acting in tension = 1

d_o:	0.75	in
n_t:	10	
A_{se}:	0.334	
f_{uta}:	60	kips
N_{sa}:	20.04	kips
Φ:	0.75	Steel Factor
ΦN_{sa}:	15.03	kips

$$A_{se} = \frac{\pi}{4}\left(d_o - \frac{0.9743}{n_t}\right)^2$$

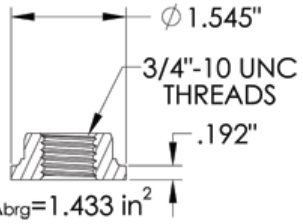


Step 3: Concrete Breakout Strength of Anchor in Tension (Section D.5.2)

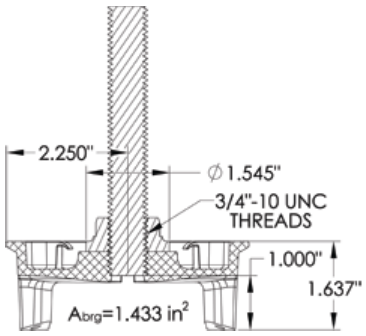
$N_{cb} = A_{nc}/A_{nco}\Psi_{ed,n}\Psi_{c,n}\Psi_{cp,n}N_b$ (Equation D-4)

Number of influencing edges = 0

h_{ef}:	7.11	in
A_{Nco}:	454.97	in^2 (Equation D-6)
A_{nc}:	523.27	in^2
$\Psi_{ed,N}$:	1.00	(Equation D-10 or D-11)
$\Psi_{c,N}$:	1.00	(Sect. D.5.2.6 - Note Cracking Controlled by D.5.2.6)
$\Psi_{cp,N}$:	1.00	(Equation D-12 or D-13)
$N_b = K_c\sqrt{f'_c}h_{ef}^{1.5}$		(Equation D-7 if h_{ef} < 11 in)
$N_b = K_c\sqrt{f'_c}h_{ef}^{5/3}$		(Equation D-8 if 11 ≤ h_{ef} ≤ 25 in)
k_c:	24	(Section D.5.2.6) k_c = (24 if h_{ef} < 11 OR 16 if h_{ef} ≥ 11 in.)
f'_c:	3000	psi
N_b:	24.92	kips
N_{cb}:	28.66	kips (Equation D-4)
Φ_c:	0.70	(Section D.4.4)
Φseis:	0.75	Additional High Seismic Factor (Wind/Seismic Cat AB: = 1)
ΦN_{cb}:	15.05	kips ΦN_{cb} must be > ΦN_{sa}



ChubbyNut-6™



ChubbySmack-6™

Step 4: Strength of Anchor in Tension (Section D.5.3)

$N_p = 8A_{brg}f'_c$ (Equation D-15)

A_{brg}:	1.433	in^2 (Area of ChubbyNut-6)
$N_{pn} = \Psi_{c,p}N$		(Equation D-14)
$\Psi_{c,p}$:	1	(Section D.5.3.6)
N_{pn}:	34.39	kips
Φ:	0.70	(Section D.4.4)
Φseis:	0.75	Additional high Seismic Factor (Wind or Seismic Cat AB: = 1)
ΦN_{pn}:	18.05	kips ΦN_{pn} must be > ΦN_{sa}

Assembly No.: **CNSCR6 [Gray]**