



**Profis Anchor 2.7.5**

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Company: Waterman Industries  
 Specifier: Amanuel Wubneh P.E.  
 Address: 25500 Road 204  
 Phone | Fax: (800) 331-0808 | (559) 562-8629  
 E-Mail: amanuel.wubneh@watermanusa.com

Page: 7  
 Project: Renaud Bros, Inc.  
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**4.4 Concrete edge failure in direction y-**

$$V_{cbg} = \left( \frac{A_{Vc}}{A_{Vc0}} \right) \psi_{ec,V} \psi_{ed,V} \psi_{c,V} \psi_{h,V} \psi_{parallel,V} V_b \quad \text{ACI 318-11 Eq. (D-31)}$$

$$\phi V_{cbg} \geq V_{ua} \quad \text{ACI 318-11 Table D.4.1.1}$$

$$A_{Vc} \text{ see ACI 318-11, Part D.6.2.1, Fig. RD.6.2.1(b)}$$

$$A_{Vc0} = 4.5 c_{a1}^2 \quad \text{ACI 318-11 Eq. (D-32)}$$

$$\psi_{ec,V} = \left( \frac{1}{1 + \frac{2e_v}{3c_{a1}}} \right) \leq 1.0 \quad \text{ACI 318-11 Eq. (D-36)}$$

$$\psi_{ed,V} = 0.7 + 0.3 \left( \frac{c_{a2}}{1.5c_{a1}} \right) \leq 1.0 \quad \text{ACI 318-11 Eq. (D-38)}$$

$$\psi_{h,V} = \sqrt{\frac{1.5c_{a1}}{h_a}} \geq 1.0 \quad \text{ACI 318-11 Eq. (D-39)}$$

$$V_b = 9 \lambda_a \sqrt{f_c} c_{a1}^{1.5} \quad \text{ACI 318-11 Eq. (D-34)}$$

**Approved AsNoted**

BY: Ken Upmal

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CID BY: DV/BK (Green Intl.)

**STATE OF VERMONT**  
AGENCY OF TRANSPORTATION

**Variables**

$c_{a1}$ [in.]	$c_{a2}$ [in.]	$e_{cV}$ [in.]	$\psi_{c,V}$	$h_a$ [in.]
4.000	-	0.130	1.000	24.000
$l_a$ [in.]	$\lambda_a$	$d_a$ [in.]	$f_c$ [psi]	$\psi_{parallel,V}$
6.000	1.000	0.750	3500	1.000

**Calculations**

$A_{Vc}$ [in. <sup>2</sup> ]	$A_{Vc0}$ [in. <sup>2</sup> ]	$\psi_{ec,V}$	$\psi_{ed,V}$	$\psi_{h,V}$	$V_b$ [lb]
432.00	72.00	0.979	1.000	1.000	4260

**Results**

$V_{cbg}$ [lb]	$\phi_{concrete}$	$\phi V_{cbg}$ [lb]	$V_{ua}$ [lb]
25016	0.700	17511	4000

**5 Combined tension and shear loads**

$\beta_N$	$\beta_V$	$\zeta$	Utilization $\beta_{N,V}$ [%]	Status
0.731	0.556	5/3	97	OK

$$\beta_{NV} = \beta_N + \beta_V \leq 1$$

**6 Warnings**

- The anchor design methods in PROFIS Anchor require rigid anchor plates per current regulations (ETAG 001/Annex C, EOTA TR029, etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Anchor calculates the minimum required anchor plate thickness with FEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid base plate assumption is valid is not carried out by PROFIS Anchor. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Condition A applies when supplementary reinforcement is used. The  $\Phi$  factor is increased for non-steel Design Strengths except Pullout Strength and Pryout strength. Condition B applies when supplementary reinforcement is not used and for Pullout Strength and Pryout Strength. Refer to your local standard.
- ACI 318 does not specifically address anchor bending when a stand-off condition exists. PROFIS Anchor calculates a shear load corresponding to anchor bending when stand-off exists and includes the results as a shear Design Strength!
- Design Strengths of adhesive anchor systems are influenced by the cleaning method. Refer to the INSTRUCTIONS FOR USE given in the Evaluation Service Report for cleaning and installation instructions
- Checking the transfer of loads into the base material and the shear resistance are required in accordance with ACI 318 or the relevant standard!
- Installation of Hilti adhesive anchor systems shall be performed by personnel trained to install Hilti adhesive anchors. Reference ACI 318-11, Part D.9.1