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3.2 Bond Strength

$N_{ag} = \left(\frac{A_{Na}}{A_{Na0}}\right) \Psi_{ec1,Na} \Psi_{ec2,Na} \Psi_{ed,Na} \Psi_{cp,Na} N_{ba}$ ACI 318-11 Eq. (D-19)

$\phi N_{ag} \geq N_{ua}$ ACI 318-11 Table D.4.1.1

A_{Na} = see ACI 318-11, Part D.5.5.1, Fig. RD.5.5.1(b)

$A_{Na0} = (2 c_{Na})^2$ ACI 318-11 Eq. (D-20)

$c_{Na} = 10 d_a \sqrt{\frac{\tau_{uncr}}{1100}}$ ACI 318-11 Eq. (D-21)

$\Psi_{ec,Na} = \left(\frac{1}{1 + \frac{e_N}{c_{Na}}}\right) \leq 1.0$ ACI 318-11 Eq. (D-23)

$\Psi_{ed,Na} = 0.7 + 0.3 \left(\frac{c_{a,min}}{c_{Na}}\right) \leq 1.0$ ACI 318-11 Eq. (D-25)

$\Psi_{cp,Na} = MAX\left(\frac{c_{a,min}}{c_{ac}}; \frac{c_{Na}}{c_{ac}}\right) \leq 1.0$ ACI 318-11 Eq. (D-27)

$N_{ba} = \lambda_a \cdot \tau_{k,c} \cdot \pi \cdot d_a \cdot h_{ef}$ ACI 318-11 Eq. (D-22)

Variables

$\tau_{k,c,uncr}$ [psi]	d_a [in.]	h_{ef} [in.]	$c_{a,min}$ [in.]	$\tau_{k,c}$ [psi]
2317	0.750	14.000	4.000	1315

$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	c_{ac} [in.]	λ_a
0.717	0.000	34.701	1.000

Calculations

c_{Na} [in.]	A_{Na} [in.^{2}]	A_{Na0} [in.^{2}]	$\Psi_{ed,Na}$
10.836	1701.23	469.65	0.811

$\Psi_{ec1,Na}$	$\Psi_{ec2,Na}$	$\Psi_{cp,Na}$	N_{ba} [lb]
0.938	1.000	1.000	43368

Results

N_{ag} [lb]	ϕ_{bond}	ϕN_{ag} [lb]	N_{ua} [lb]
119463	0.650	77651	35050

Approved AsNoted

BY: Ken Upmal
DATE: 11/29/2017
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STATE OF VERMONT
AGENCY OF TRANSPORTATION