THERE’S A THIN WALL BETWEEN SUSTAINABILITY AND STRENGTH.

Second-Order Analysis of an Uncracked Member

1. ECCENTRICITY OF APPLIED LOAD = 8 in
2. TEMP. DIFF. INSIDE TO OUTSIDE = 50 Degrees
3. MIDSPAN BOWING DUE TO TEMP. = 0.61 in
4. BRACED FRAME - NO JOINT TRANSATION
5. JOINTS ASSUMED PINNED TOP AND BOTTOM
6. MEMBER HAS A SIMPLE SPAN LENGTH = 32 ft
7. MOMENTS OR DEFLECTIONS THAT CAUSE OUTWARD BOWING ARE POSITIVE
8. SERVICE LOAD:
   • LATERAL LOADS DUE TO WIND, $W = 0.2$ kip/ft.
   • APPLIED DEAD LOAD, $P_{dl} = 10$ kips
   • APPLIED LIVE LOAD, $P_{ll} = 10$ kips
   • PANEL WEIGHT AT MID-HEIGHT = 12.0 kips

Pre Stressing Data:
- $F_{pu} = 270$ ksi
- $P_{d} = 17.0$ kips
- $W_u = 0.320$ kip/ft.
- $P_{dl} = 12.0$ kips
- $P_{s} = 1.221$ in.
- $P_{L} = 0.207$ in.

Loading Assumption #1: $U = 1.2D + 1.6W + 0.5L$

- $TBMF = 0.25$
- $Pu = 12.0$ kips
- $Wu = 0.320$ kip/ft.
- $Pu_{dl} = 12.0$ kips
- $\beta(d) + 0.71 \phi(k) = 0.75$

$El = TBMF \times \phi(k) \times Ec \times Ig/(1+\beta(d)) = 3.62 \times 10^6$ kip-in$^2$

Determine Additional Deflection at Midspan Due to Total Ultimate Deflection

$\delta_1 = 0.189$ in
$\delta_2 = 0.205$ in
$\delta_3 = 0.206$ in
$\delta_4 = 0.207$ in
$\delta_5 = 0.207$ in
$\delta_6 = 0.207$ in

Section Properties:
- Cracking Moment Modification Factor, $CMMF = 0.625$
- $I_{gmin} = 720$ in$^4$
- $A_{area} = 720$ in$^2$
- $I_{gmax} = 1560$ in$^4$
- $t_{g} = 6$ in
- $s_{in} = 1560$ in$^3$
- $s_{out} = 1560$ in$^3$
- Concrete Unit Weight = 150 pcf
- $f'c = 6$ ksi
- $Ec = 4696$ ksi

- $t_{g} = 6$ in
- $s_{g} = 1560$ in$^3$

Design Guide Brochure

CONCRETE INDUSTRIES, INC.
THERE’S A THIN WALL BETWEEN SUSTAINABILITY AND STRENGTH.

Design Guide Brochure
THIN-Wall — Redefining what eco-friendly buildings can be.

With two 3” layers of concrete, THIN-Wall delivers the same insulating and load-bearing performance of thicker walls while using less cement, which minimizes carbon dioxide emissions. THIN-Wall has architects rethinking their approach to sustainable buildings.

Nu-Tie Shear Connector
- Very High Tensile Strength - 110 KSI
- Thermally Non-Conductive
- Low Stiffness (Modulus) Mitigates Thermal Bowing - 7,000 KSI
- Strong yet flexible in the best balance of Strength and Stiffness for Wall Panel Construction
- 2” Embedment - 3 kip pullout capacity

Benefits of Nu-Tie
- Fully Insulated Wall Panels with NO thermal bridges from connectors
- Use less concrete - Overall wythe thickness reduced
- Use the insulation of your choice from multiple suppliers (EPS or XPS)
- Straight forward and validated design methodology

Design Guidance
The design of structural load bearing walls for the THIN-Wall system follows the methodology of the PCI Handbook. The Nu-Ties are oriented vertically and positioned as per the latest version of the THIN-Wall design software.

Contact Information
To learn more, visit thin-wall.com or email Douglas.Gremel@owenscorning.com to request a USB drive full of additional information.