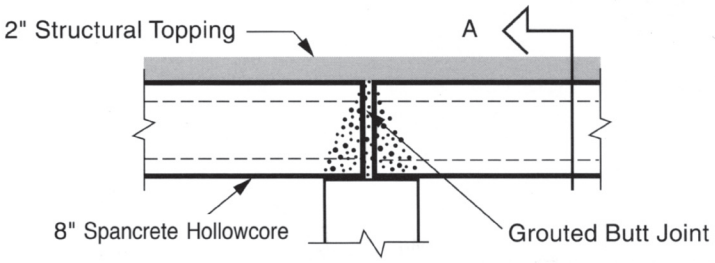
SPANCRETE MANUFACTURERS ASSOCIATION

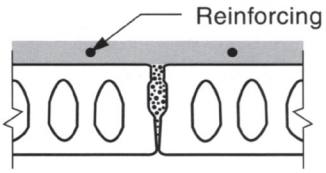
RESEARCH NOTES

CONTINUITY OVER SUPPORTS

Tests were conducted to determine whether mild reinforcements in a structural topping was an effective method to achieve continuity at plank ends. The most common application of this is for an increase in ultimate strength and a decrease in live load deflections.



BUTT JOINT DETAIL



SECTION A

CONCLUSIONS:

1. Negative moments and corresponding increases in ultimate strength can be achieved by using mild reinforcement in a structural topping.

2. Care must be taken to insure adequate bond between the topping and the plank.

3. Mild reinforcing will yield, and moment redistribution can be accomplished with reinforcing ratios ranging from 0.26% to 0.44%.

4. The mild reinforcement will cause a distribution of negative flexural cracking under loading, instead of one crack over the butt joint.

A design example is given on the reverse side.

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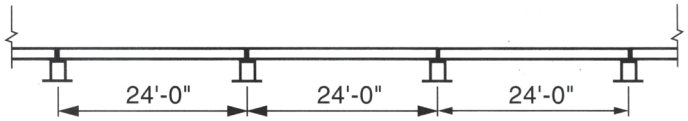
DESIGN EXAMPLE

CONTINUITY OVER SUPPORTS

GIVEN:

A 24 foot multispan 8" Spancrete® system with 2" structural topping. Superimposed live load = 100 psf, plank dead load = 64 psf, topping = 25 psf.



PROBLEM:

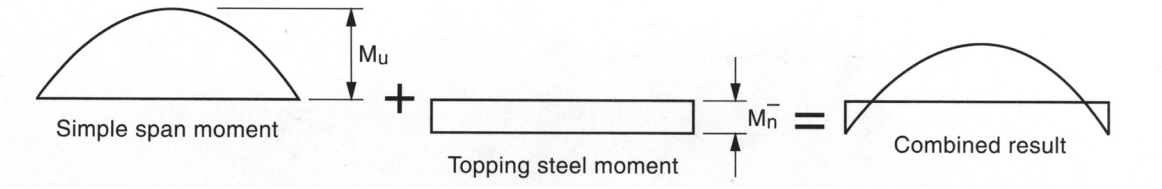
Determine reinforcing requirements of plank and topping.

SOLUTION:

For interior spans (exterior span approach is similar):

$M_u = [\ 1.2\ (DL) + 1.6\ (LL)\ ]\ L^2 \div 8 \times 1000$

$M_u = [\ 1.2\ (64 + 25) + 1.6\ (100)\ ]\ 24^2 \div 8000 = 19.21$ k-ft/ft



Select a plank series less than required by simple span moment alone, since the plank ultimate moment capacity must equal $M_u + M_n^-$ combined.

Try a plank from the load tables with $M_u = 15.17$ k-ft/ft

If $M_u + M_n^- = 15.17$ k-ft/ft, then $M_n = 15.17 - 19.21 = -4.04$ k-ft/ft

$\varnothing M_n^- = \varnothing A_s^- f_y\ j_u d;\ A_s^- \cong (4.04 \times 12) \div (0.9 \times 60 \times .9 \times 9) = 0.11$ in^2/ft

This can be supplied by #3 bars at 12" or 6 x 6 - W5.5 x W5.5 mesh.

Note: Sample calculations are intended to illustrate the concept presented and do not represent all considerations necessary for the complete design. This research was done using 40" wide, 8" thick Standard Spancrete. However, this concept applies to all Spancrete cross sections.

MIDWEST
Hanson Structural Precast Midwest, Inc.
Maple Grove, Minnesota

Spancrete, Inc.
Green Bay, Wisconsin

Spancrete Industries, Inc.
Waukesha, Wisconsin

Spancrete of Illinois, Inc.
Arlington Heights, Illinois

Wells Concrete
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Armenia, China, Denmark, Guatemala, Hungary, Ireland, Japan, Russia, South Korea, Switzerland