



RESEARCH NOTES

CONCENTRATED LOADS ON TOPPED SPANCRETE® HOLLOWCORE DECKS

In tests conducted on untopped Spancrete assemblies, concentrated loads were found to induce transverse bending moments in addition to moments in the direction of plank span. Limits were established for concentrated loads so that transverse bending would not control a design. This information is contained in the Research Note entitled CONCENTRATED LOADS ON UNTOPPED SPANCRETE DECKS.

One of the parameters affecting the capacity to resist splitting due to concentrated loads was the transverse section modulus. Addition of a composite structural topping increases the transverse section modulus, and therefore should increase the resistance to concentrated loads. Load tests were conducted using 48" wide* Ultralight Spancrete to verify this anticipated increase in strength.

CONCLUSIONS:

1. Concentrated load capacity was increased with the addition of a structural topping in proportion to the increase in transverse section modulus.
2. Concentrated load capacity was not significantly affected by the amount or type of reinforcing used in the topping.

RECOMMENDED CONCENTRATED WORKING LOAD LIMITS FOR SPANCRETE WITH STRUCTURAL COMPOSITE TOPPING

Deck Thickness:	4"+2"	6"+2"	8"+2"	10"+2"	12"+2"	16"+2"
Single Point Load	5.9	10.3	12.7	15.9	19.2	28.8
Each Double Point Load Spaced $\geq 0.5L$	4.0	6.8	8.5	10.6	12.9	19.3
Each Double Point Load Spaced $< 1'$	3.0	5.1	6.3	7.9	9.6	14.4

Note:

1. Values are based on a factor of safety of 2 and a ϕ factor of 0.9.
2. Values for 4", 6", 10", 12" and 16" plank are extrapolated and not verified by test.
3. Interpolation is allowed for double point loads spaced between 1' and 0.5L apart.
4. Topping is 4000 psi at 28 days with $E = 3000$ ksi.
- * 5. Slab width will affect load limits; consult your local producer regarding other sections.
6. Minimum recommended bearing area under a concentrated load is 4" x 4".

A design example is given on the reverse side.

CONCENTRATED LOADS (TOPPED)

GIVEN:

8" Topped Ultralight Spancrete® hollowcore system shown

$P_1 = 3.5^k$ DL and 2.5^k LL

$P_2 = P_3 = 4.7^k$ DL and 3.0^k LL

$P_4 = P_5 = 4.6^k$ DL and 3.1^k LL

PROBLEM:

Evaluate the concentrated loads for application on 8" Spancrete with a 2" structural topping.

SOLUTION:

Case 1

$P_1 = 3.5^k + 2.5^k = 6.0^k$. This is OK, since recommended concentrated load limit is 12.7^k .

(See table on front side.)

Case 2

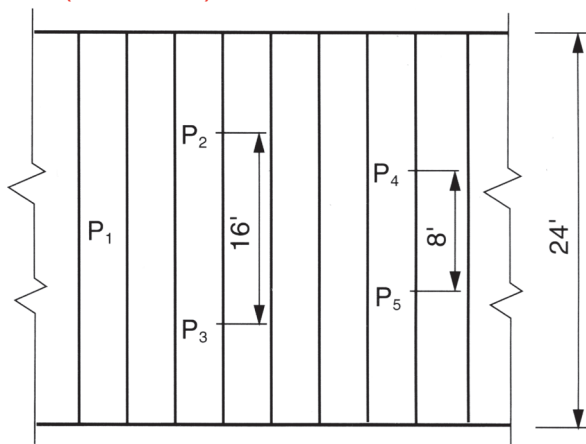
Spacing of P_2 and P_3 at 16' is greater than 0.5L. $P_2 = P_3 = 4.7^k + 3.0^k = 7.7^k$ This is OK, since recommended concentrated load limit is 8.5^k .

Case 3

Spacing of P_4 and P_5 at 8' is less than 0.5L. Interpolate between 6.3^k for $< 1'$ spacing and 8.5^k for $\geq 0.5L$.

$$\text{Recommended load limit} = 8.5 - \frac{(12 - 8)}{12} (8.5 - 6.3) = 7.8^k$$

$P_4 = P_5 = 4.6^k + 3.1^k = 7.7^k$. This is also OK, since it is less than the interpolated load limit.



Note: Sample calculations are intended to illustrate the concept presented and do not represent all considerations necessary for the complete design.

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Armenia	Ireland
China	Japan
Denmark	Russia
Guatemala	South Korea
Hungary	Switzerland

Spancrete® hollowcore is a registered trademark