SPANCRETE MANUFACTURERS ASSOCIATION

RESEARCH NOTES

CONCENTRATED LOADS ON UNTOPPED SPANCRETE® HOLLOWCORE DECKS

When Spancrete hollowcore plank shear keys are grouted, the resulting system has many of the characteristics of a monolithic plate. One such characteristic is the development of bending moments transverse to the span resulting from concentrations of load; since Spancrete is unreinforced in the transverse direction, we must place limits on this situation.

A series of tests were conducted to study how concentrated loads apply to a Spancrete system. Load location and bearing plate size were used as variables; transverse spacing of concentrated loads was not considered in this test series.

CONCLUSIONS:

1. There is no significant difference between placing loads over a grout key compared with placing loads within the center of a Spancrete unit.
2. The bearing plate size has little effect on the load capacity.
3. When two concentrated loads are placed in a line parallel to the span, a reduction in individual load magnitude is necessitated.

RECOMMENDED ONE OR TWO POINT CONCENTRATED LOAD LIMITS ON UNTOPPED SPANCERETE
(Working Loads)

SPANCRETE THICKNESS	4"	6"	8"	10"	12"	16"
Each Single Point Load	3.4	7.5	10.1	13.5	16.8	25.8
Each Double Point Load Spaced ≥ 0.5L	2.3	5.0	6.8	9.0	11.3	17.3
Each Double Point Load Spaced < 1'	1.7	3.7	5.0	6.7	8.4	12.9

Note:

1. Values in each case are maximum recommended working loads using Ultralight Spancrete. Check with your local Spancrete manufacturer, as higher capacities than those shown may be available.
2. Values are based on a factor of safety of 2 and a ⌀ factor of 0.9.
3. Values for 4", 6", 10", 12" and 16" plank are extrapolated and not verified by test.
4. Interpolation is allowed for double Point loads spaced between 1'-0" and 0.5L apart.

A design example is given on the reverse side.

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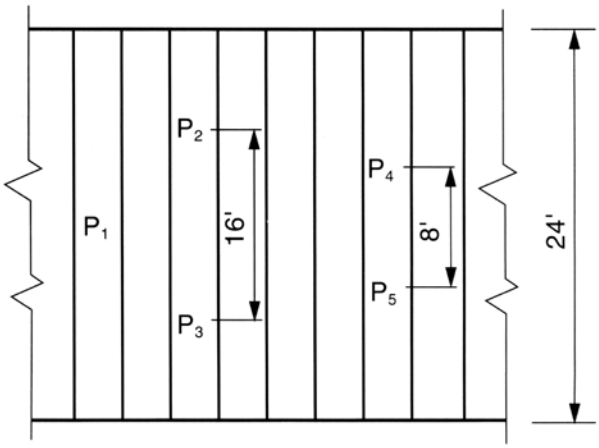
DESIGN EXAMPLE

CONCENTRATED LOADS (UNTOPPED)

GIVEN:

8" Ultralight Spancrete® hollowcore system shown
P_1 = 3.5^k DL and 2.5^k LL (working loads)
P_2 = P_3 = 3.7^k DL and 2.0^k LL (working loads)
P_4 = P_5 = 3.6^k DL and 2.2^k LL (working loads)



PROBLEM:

Evaluate the concentrated loads.

SOLUTION:

Case 1

P_1 = 3.5^k + 2.5^k = 6.0^k. This is less than the recommended concentrated load limit of 10.1^k for 8" Spancrete, and is acceptable.
(See table on front side.)

Case 2

P_2 = P_3 = 3.7^k + 2.0^k = 5.7^k The spacing of these loads is greater than 0.5L. Since each load is less than the 6.8^k recommended concentrated load limit for 8" Spancrete under this category, this case is acceptable.

Case 3

P_4 = P_5 = 3.6^k + 2.2^k = 5.8^k The spacing of these loads is less than 0.5L. Interpolate between 5.0^k for spacing less than 1' and 6.8^k for spacing $\geq$ 0.5L.

$$\text{Recommended load limit} = 6.8 - \frac{(12 - 8)}{12}(6.8 - 5.0) = 6.2^k \text{ for each load.}$$

Since each load is less than the 6.2^k recommended concenrated load limit for 8" Spancrete under this category, this case is acceptable.

(See Research Note entitled **"LOAD DISTRIBUTION"** for effective distribution width).

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