



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 SPANCRETE (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 $\geq 0.5L$	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 ϕ 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.

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

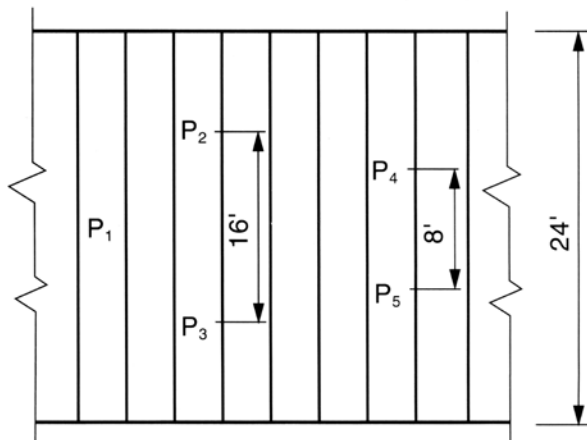
$P_4 = P_5 = 3.6^k + 2.2^k = 5.8^k$. The spacing of these loads is less than $0.5L$. Interpolate between 5.0^k for spacing less than 1' and 6.8^k for spacing $\geq 0.5L$.

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

Since each load is less than the 6.2^k recommended concentrated 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.



EAST

Oldcastle Precast, Inc.
South Bethlehem, NY

Oldcastle Precast, Inc.
Manchester, NY

Conewago Precast Building
Systems
Hanover, PA

MIDWEST
Spancrete, Inc.
Green Bay, WI

Spancrete Industries, Inc.
Waukesha, WI

Hanson Structural Precast
Midwest, Inc.
Maple Grove, MN

Spancrete of Illinois, Inc.
Arlington Heights, IL

WEST
Hanson Structural Precast
Pacific, Inc.
Inwisdale, CA

KIE-CON
Div. of Kiewitt Pacific Co.
Antioch, CA

Owell Precast
Sandy, UT

SOUTHWEST
Manco Structures, Ltd.
Schertz, TX

SOUTH

Cement Industries, Inc.
Fort Myers, FL

Florida Precast Industries, Inc.
Sebring, FL

MC Precast, Inc.
Atlanta, GA

CANADA
Burnco Concrete Products Ltd.
Calgary, Canada

EGYPT
Samcrete Egypt
Ahram, Giza

MEXICO

ITISA
Mexico City, Mexico

Spancrete Noreste
Monterrey, Mexico

TURKEY
Yapi-Merkezi
Camlica-Istanbul, Turkey

CARIBBEAN
Preconco Limited
Barbados, West Indies

Spancrete Caribbean, Ltd.
Trinidad, West Indies

UAE
Hi-Tech Concrete Products, LLC
Abu Dhabi, UAE

MACHINE MANUFACTURER
Spancrete Machinery
Corporation
Waukesha, WI

Spancrete is also manufactured in

Armenia	Denmark	Russia
Australia	Guatemala	South Korea
Belgium	Hungary	Spain
Brazil	Ireland	Switzerland
China	Israel	
Croatia	Japan	