



More on Topping Off Your Spancrete Floor

Introduction

Span Note no. 11, titled: “Topping Off Your Prestressed Hollow Core Floor”, discusses the various finishing options available when designing Spancrete floor systems. These options include: 1) Structural topping, 2) Non-structural topping, and 3) Skim coat underlayments. This Span Note provides additional information regarding the structural topping option, and is available for the design and installation of this material.

Some of the following guidelines will help reduce and control cracking in the concrete topping, but specifiers should understand that the total elimination of cracks is not achievable with today's technologies. Also, appropriate placing and curing procedures must be followed to avoid delamination and/or “curling” of the topping slab. Reference the current edition of the “ACI Manual of Concrete Practice” for numerous reports addressing these issues.

The Contract Documents prepared by the Engineer of Record for the project should include detailed specifications addressing the issues discussed in this document. A successful, high-quality project will result when the Architect, Engineer, Contractor and Precaster work together in the beginning phases to ensure that the most practical and economical construction is utilized.

Benefits from Adding a Structural Concrete Topping

- Levels the floor to compensate for the inherent camber in the prestressed planks. (The specifier should note that the camber in the plank is the result of the plank thickness, span, and the prestress forces required to resist the design loads. Consequently, this “inherent” camber cannot be adjusted to accommodate topping thicknesses.)
- Provides a harder floor surface where self-leveling toppings are not appropriate.
- Adds stiffness and strength to the floor system for resisting gravity loads.
- Increases the strength of the floor diaphragm for horizontal loads.
- Increases the fire rating of the floor system.
- Further reduces floor system vibrations.
- Further reduces the sound transmission between floors.

Cost From Adding a Structural Concrete Topping

- Curing of the concrete topping adds time to the overall construction schedule.
- Placing topping in cold weather conditions may result in additional costs to enclose and heat the area under construction.



What to Specify?

- To establish a topping thickness, first contact your Spancrete supplier to determine the cambers for the various plank spans and loadings on your particular project. Camber will vary due to several factors noted in the aforementioned “Benefits” section, and your Spancrete supplier has the experience and design tools available to determine the anticipated maximum cambers for your specific design conditions.
- Require a minimum topping thickness at the center of the plank span of 2”. The value determined for maximum camber plus the additional 2” will then be the elevation of your finished floor.
- The topping thickness will increase at the ends of the span, with a maximum thickness equal to the camber of the plank plus the specified minimum thickness at the center of span.
- A minimum concrete topping strength of 3000 psi should be specified, unless higher strengths are dictated by design.
- Reinforcement in the topping is not required by the precast manufacturer since it is not a factor in the design of the composite system comprised of the Spancrete plank and the bonded topping. However, to control shrinkage it is recommended that reinforcing in the form of welded wire mesh be installed in the topping. Care should be taken to ensure that the mesh is located at the center of the topping layer in order to be effective.

- The top surface of the Spancrete planks should be prepped to provide adequate bonding to the concrete topping. A variety of finishes will achieve the 80 psi horizontal shear requirement in accordance with ACI 318. Consult with local plank producers for available options.
- To minimize cracking due to volume changes, saw cut control joints should be installed as soon as possible after the topping is placed. Common practice is to locate the control joints to divide the footprint of the topped floor into relatively square shapes. The saw cut joints should be a minimum depth of **1/2"** of the topping thickness (i.e., 1/2" deep for 2" topping).
- Perpendicular to the plank span, joints should be placed at the ends of the plank and over the supporting walls and beams. Perpendicular joints should never be placed at intermediate or mid-span locations, as this will reduce the structural capacity of the system.
- Parallel to the plank span, the joints should be placed directly over the plank joints.
- Interruptions in the topping by interior walls, conduits, expansion joints, etc., will reduce, or perhaps entirely eliminate, the composite action of the topped floor system. These details must be reviewed and approved by a qualified structural engineer.

Avoid These Mistakes

- Concrete topping should not be used to grout the precast plank keyways. Standard 1:3 cement-sand grout should be used to fill plank keyways prior to placement of the concrete topping.
- Carefully consider the plank thickness to use on your project. In some cases, a relatively thin composite section may be capable of supporting the required loads, but large cambers may require thicker toppings, offsetting any savings realized by using thinner plank sections.
- Take care when detailing additions to existing buildings to allow for the plank thickness, camber, and minimum topping thickness when setting elevations of support walls and beams.

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