Single-use curing blankets provide uniformly colored slabs

Wet Curing Concrete Floors

The curing blanket lies down flat as it is unrolled. Below, left: Sheets stay together without taping when overlapped only 2 to 3 inches. Below, right: The curing blankets are unrolled onto a wet slab surface.

TIM FRANCE, P.E.

By Tim France, PE

There is no quick and easy way to wet-cure concrete—at least that's what I used to believe. After 18 years as a structural engineer, I have worked on numerous slab-on-grade projects and used traditional wet-cure methods. Most of these techniques, particularly synthetic curing blankets, were time-intensive, expensive, and they sometimes left discolored areas on the slab. Because of recent industry trends, our firm has consulted on numerous integrally colored concrete slabs, where discoloration from traditional wet-curing is a major issue. Recently however, I had an opportunity to test an innovative, wood-pulp fiber fabric that readily absorbs and more evenly distributes water on both integrally colored and gray slabs.

A bit of history

To cure concrete slabs cast on the ground, contractors traditionally use ACI-recommended methods of water wet-curing. To achieve proper hydration at the concrete surface, contractors will mist or soak the concrete surface or cover the slab with soaked burlap, coated paper, plastic sheeting, or synthetic-fiber plastic-backed blankets.

Each of these water retention techniques has the same goal of hydrating the surface, thereby improving abrasion and wear resistance once cured. We have learned, however, that each of these practices has its own set of consequences.

Soaked burlap, for example, requires periodic rewetting, which may not always be done, and even then it often leaves spotty wet and dry surface areas. This can discolor concrete and leave a fabric pattern on the slab. With the trend toward decorative concrete floors, this discoloration can be a serious problem. To prevent this discoloration, burlap has to be sized and cleaned prior to use.

Plastic sheeting and coated paper both keep a slab surface moist, but these techniques are labor-intensive since the edges of the sheeting and the paper need to be overlapped and taped. If not properly taped down or weighted, winds can cause the sheeting and paper to come up in areas, leaving dry spots and uneven curing of the slab surface. Coated paper and plastic sheets can also cause discoloration from the contact and non-contact areas. The non-contact areas often are significantly lighter, and in some cases, efflorescence can appear. This contrast in coloration can be an important issue since most owners want aesthetically pleasing concrete floors, particularly for retail stores.

The most problematic hydration technique is wetting by misting, sprinkling, soaking, or flooding. Besides requiring round-the-clock observation, the wetting procedure is impractical for most construction projects and may cause problems from water runoff if not properly supervised. Excessive curing water runoff could result in the slab subbase becoming water soaked, which could weaken the base and increase curling of the slab.

Problems with curing blankets

Trying to rectify the issues caused by wet curing, several manufacturers have developed improved curing blankets made of synthetic fibers bonded to impervious opaque plastic sheeting. Although these blankets are an improvement, they have some shortcomings. First, the blankets do not readily absorb water, nor do they easily lie flat after their initial use. Although the blankets can be reused, they get dirty, are hard to store, and are difficult to clean. Unfortunately, if these blankets are not cleaned, they may create the same slab discoloration problems as burlap. Carrying project debris from job to job does not lend itself to quality, especially on an integrally colored slab. Also, these synthetic blankets, like paper and plastic sheeting, must be overlapped, taped, and weighted to stay in place under windy conditions. And, just like with plastic sheeting, the blankets can cause discoloration and efflorescence.

A curing blanket that works

Recently, I had the opportunity to test a single-use curing blanket and to compare it with the alternatives. The product we have started to use is a wood pulp-based fiber fabric with an impervious clear plastic cap layer. What I liked about this blanket is that it arrives at the worksite clean, virtually wrinkle-free, and sealed in rolls. Once the 57-pound rolls are opened, the curing blanket is rolled out rather than laid on the wet slab. The fiber fabric readily absorbs water, and because of its wicking action, helps distribute the water to other areas on the slab to create an even, wet-cured surface.

With this new curing blanket, UltraCure NCF, there is no guessing where the dry areas are. Because of its clear plastic backing, workers can easily see areas that are dry, and wet those areas by moving water under the blanket. Another advantage of the new blanket over older synthetic products is that the UltraCure blanket edges do not have to be taped if the pieces are properly overlapped 2 to 3 inches. This overlap proves to be a significant cost saver when compared with synthetic products, which are overlapped 8 to 12 inches. This pulp-based blanket also helps prevent discoloration because of the blanket's absorption capability. However, I believe that despite all of these advances, the best feature of this new curing blanket is its price, which at this time is about one-half to one-third the cost of traditional synthetic curing covers.

Typical installation

Typical installation of this curing blanket is to flood the surface with water until a thin film of water, about 1/32 to 1/16 inch, stays on the surface. Remove the packaging, position on the slab with the roll edge parallel to the slab edge and unroll it, watching and correcting its position to eliminate wrinkles. Monitor the absorption, and add water if needed. If dry spots are noted, add water under the blanket with a small diameter hose or by using a roller squeegee to move the water around until the entire blanket has become translucent. The time to remain on the slab is typically referenced in the project specifications. Most specifications require at least seven days; however this varies from a minimum of three days to 14 days for most projects; follow the project specifications.

Comparison testing

How well does this new single-use curing blanket perform compared to reused synthetic fiber blankets? To find out, we conducted a side-by-side field comparison using two slabs, both about 15,000 square feet, wetted over their entire surfaces. We used the UltraCure blanket on one slab and previously used