

Who lost the slump?

Lightweight concrete has its own set of potential placing problems, as every contractor knows. These problems were compounded 7 years ago when Albanelli poured suspended concrete slabs on steel decking for a high-profile shopping mall in suburban Detroit.

Each ready-mix truck carried 10 cubic yards of concrete containing Haydite, an expanded shale lightweight aggregate from Cleveland. This lightweight stone contains many air voids, lowering the unit weight of the concrete to about 110 pounds/cf. The voids can raise the water demand if the stone is not thoroughly saturated before mixing. Pumping under pressure causes air voids to contract and forces water into the aggregate pores, resulting in a dry mix.

The owner's representative became concerned when, after several slabs with about an 8-inch slump were placed, a few test cylinders broke at lower than expected 7-day strength. These cylinders eventually came up to design strength, but that didn't prevent costly lessons in the meantime.

Reverting to the spec book, the owner's rep insisted on the specified maximum 4-inch slump. After much discussion (we refused to pump at that slump), a 6-inch slump was

permitted if we achieved it using water reducers. This seemed a reasonable solution, but we were about to learn our first lesson.

The next pour was the farthest from the only pump access on this job. We used a 28-meter boom pump with about 400 feet of 5-inch steel line. At the rep's direction, the testing inspector insisted that we meet the 6-inch slump, measured at the ready-mix truck—not at the point of placement.

After struggling to place about 4000 square feet (with an actual slump of 3 to 4 inches after pumping), and consistently being denied our requests to add water to the mix, the pump discharge slowed drastically. In the end, there was almost no slump at all. The concrete looked as if it were coming out of a sausage maker. Eventually the flow of concrete stopped; it had set up in the pump line.

With six full truckloads of concrete sitting on the job and no way to pump it, tempers began exploding like fireworks on the Fourth of July. The pour was stopped, and the entire pump line, including the boom, had to be taken apart piece by piece and cleared out (with hammers and pieces of pipe and rebar). Everyone (finishers included) was put to work,



Right: Paul Albanelli of Albanelli Cement Contractors of Farmington Hills, Mich. Albanelli is a family-owned company with over 50 years of concrete construction experience. Above: The crew places lightweight concrete on an elevated slab.



and I, with the help of the owner of the ready-mix company, led the effort.

After we finished the portion of the slab we were able to place—without a bulkhead or construction joint—we had one option: take jackhammers to the rest. We not only had to jackhammer out 1200 square feet of elevated slab, but in the process, we punctured the supporting metal deck, which then had to be replaced, an expensive lesson. Demolition took 2 to 3 days with a crew of four to five. (Fortunately, there was no scheduling penalty to add insult to injury.) Six truckloads of concrete were lost.

We came away from that pour with some important lessons in placing lightweight concrete. First, make sure that the aggregate

is presaturated and that there is enough water in the mix to compensate for the water absorbed by the lightweight aggregate under pumping pressures. (Water reducers to increase the slump aren't effective if there is not enough water for the porous stone.) Second, at the pre-construction meeting, discuss the need for additional mix water and insist that slump be measured at the point of discharge, as specified by ASTM. Finally, try to limit the horizontal run of pump line to as short a distance as possible. By following these critical steps, we have successfully placed many more lightweight slabs without the problems encountered the day the slump disappeared.

— Paul Albanelli

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