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DISCUSSION

DISCUSSION OF THE PAPER "AN EVALUATION OF CONTROLLED PERMEABILITY FORMWORK FOR LONG-TERM DURABILITY OF STRUCTURAL CONCRETE ELEMENTS" BY A.K. SURYAVANSHI AND R.N. SWAMY[1]

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In their paper the authors concluded that ". . . CPF is not fully effective in its intended purposes of generating a permanent and long lasting dense impermeable concrete layer adjacent to it. . . . "

This statement goes against the results of more than 100 studies (1) carried by independent institutes and laboratories over the last 7 years on a broad range of concrete mixes.

A number of comments to the paper need to be made:

Contrary to the statement ". . . instead of using a number of small specimens . . ." almost all studies mentioned above (1) were conducted on core samples taken from large panels, in order to best simulate site conditions. As a matter of fact, a number of tests have also been conducted on cores taken from true construction sites. All tests indicate "substantial" improvements when using CPF.

The normal procedure for casting any concrete require that the poker vibrator be kept at 75 to 100 mm from the formwork. The concrete having been poured and vibrated in 50 mm thick layers, a clogging of the CPF might have taken place due to forced intrusion of cement particles into the filtering layer, with a consequent lack of drainage. A measurement of the amount of drained water would have confirmed that. It is evident that the used casting procedure does not reproduce site conditions and that, as a consequence, the measured CPF performance is only of academical interest.

The paper does not mention any measurement of w/c ratio at different depth. We do not understand the reason for stating that CPF "only marginally decrease the w/c ratio. . . ." The suggested increase of cement content at the 0–5-mm and 5–25-mm depth intervals is certainly a proof that a water flow towards the CPF has taken place, and that it has entrained a number of cement particles. But the increased cement content is certainly not the only reason for a lower w/c ratio.

Last, and most important, the study compares things which are not comparable! The paper indicates that both cast slabs had Zemdrain® at the bottom. This means that the authors have compared the properties of the "bottom" of the slab to those of the "top" of the slab. As air and bleeding water can freely escape from the top, particularly under the used casting procedure, the conditions of the two surfaces are certainly not similar. Would the authors

[1]Cem. Concr. Res. 27, 1047–1060 (1997).
[2]Zemdrain® is Dupont's registered trademark for CPF liners.

have compared the CPF-generated bottom to a bottom cast on a conventional, impervious formwork, the results would have been quite different, and a correct measurement of the CPF performance would have been obtained. The test program as it has been conducted is scientifically incorrect and so are the conclusions from the test results.

Based on above comments, the conclusions that: “CPF is not fully effective in its intended purpose. . . ,” “the CPF does not generate a dense impermeable concrete. . . ,” and “the CPF only marginally reduces the w/c ratio. . .” are unacceptable. They generate unjustified doubt on the work carried by those who have used correct procedures, and generate doubt on the performance of a system that offers evident benefits to the durability of concrete structure.

Reference

1. DuPont internal list of studies conducted on Zemdrain® CPF, partly unpublished.