Paneltech

TECHBULLETIN

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Optimized saturation

can improve concrete form performance

It's nothing new. The overlay takes the beating on MDO and HDO concrete forms. In fact, most attention is put into design of the overlay and the veneer substrate immediately beneath the overlay.

What is also not new is the importance of internal bond of the paper to the health and longevity of the concrete form. Early testing, such as a test done by the old Crown Forest Industries, found:

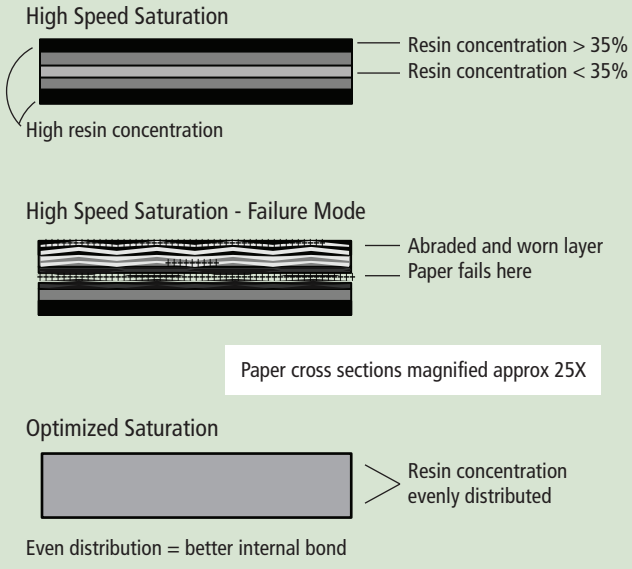
"The most important criteria for performance in these tests was paper failure: How many successive concrete pours could be made before the paper started delaminating and/or sticking to the concrete." The study further states that ***"paper failure often occurs as an*** [internal] ***delamination; the glueline does not fail, but the paper shears almost in half...*** paper failure occurs when the panel is stripped from the concrete if the PF resin allows water from the concrete to soften the paper, and if the concrete is stuck hard to the paper."

Reasons for variability in the internal bond of overlay papers are less obvious, until you think about the potential effects of ***saturation quality,*** *the way the resin is distributed top-to-bottom through the cross section of the* sheet. (See diagram)

When you increase line speed, a larger fraction of the resin tends to remain in the outer part of the sheet, because of the time it takes the resin to physically saturate the paper.
Manufacturers try to influence this with surfactants and dwell rolls, ***but resin penetration just takes time.*** While the extra surface resin can resist the initial penetration of caustic, over time the abrasive action of the high-alkali concrete eats through the surface layer exposing the relatively resinstarved core area to the alkali. This action tends to weaken the core and allow delamination.

And this is not just a problem with MDO panels! Industry experts have long pointed to MDO failures as the weak link in performance of HDO panels in the field and in pour tests.

Paper Cross Sections
High Speed vs Optimized Saturation



These differences hit you in the face when you compare overlays run by the different manufacturers in a caustic abrasion test.

The caustic abrasion test compares the abrasion resistance of overlays after soaking in a caustic solution for 72 hours. This is done by running samples 10,000 cycles on a turntable under a standard abrasive wheel on a Taber abrasion tester and comparing the weight and caliper of the sample before and after testing. In our analysis, we compared abrasion resistance of each sample to a BB panel by subtracting the sample loss from the loss experienced on a BB panel. While we must acknowledge that this test is not as definitive as an actual field test or pour test, it gives a strong indication of likely field performance.

We tested three competitive overlays against a BB panel, standard 389C, a second B-staged overlay run at slower line speeds, and a third manufacturer's MDO manufactured at perhaps twice the line speed of the others.

While the overlays all performed well, much better than a non-overlaid BB plywood panel, the Paneltech 389C paper with its optimized saturation had lower abrasion losses than either of the competitive products, and the product with the highest abrasion loss was the one run on the competitor's high-speed treater. (See diagram on next page)
While the test method is developmental and results approximate,

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should you have panel systems that you would like us to evaluate, we would be happy to do so.