SAVE OUR SHEETS!

AVOID 'HYDROBURSTS'

Water trapped in high thread-counts sheets can damage textiles during extraction; we look at causes and prevention

By Sam Garofalo

Since the late '90s hydroburst damage in sheeting occasionally has wreaked havoc in tunnel plants—especially those utilizing hydraulic presses for water extraction. On rare occasions we've seen them in healthcare plants in conventional washers with high-speed extraction. The damage was sporadic and within the acceptable .9% industry standards for ragout, so it didn't really sound any alarms.

We can expect a few damaged sheets a week, but what happens when you start blowing out 20-30 pieces a day? Most laundry operators don't even realize that there's a problem until calls start coming in from irate COG customers to deliver the bad news and accuse the laundry of destroying their inventory.

Hydrobursts and some manufacturing defects that mimic hydroburst damage are an anomaly that causes millions of dollars in damage annually. Actual hydrobursts have become a more prominent issue since new high thread-count sheeting of T-250 or higher has become common in high-end hospitality properties. Rarely do you see hydrobursts in healthcare facilities because the yarn counts there are historically T-180 (percale) or less.

In order to manufacture high thread-count fabrics, the yarns must have a smaller diameter and are woven much tighter to accommodate the increase in required yarns per inch. This is double trouble because the smaller diameter yarns will be weaker, and they'll be packed so tightly that it produces a less flexible semi-impermeable water barrier. This makes the fabric prone to bursts.

In my opinion, 100% cotton sheeting, T-250-plus fabric is problematic. Aside from extraction-press problems, the tight weave, narrow yarns and diminished elasticity create more friction in the fabric that will produce wear patterns that have a tendency to tear. The hand of a T-250-plus, 60% cotton 40% polyester sheet is excellent because the polyester is stronger more durable and supports the cotton. The photo (figure 1) shows a side-by-side comparison of a T-180 sheeting sample on the left and a T-300 on the right.

As you can see, the T-180 has space in between the yarns where water can escape. The yarn diameter also is visible.

Since the '90s, equipment manufacturers were challenged to develop new, faster, water-extraction devices that were more efficient at removing water. This need for speed and producing a lower water-retention percentage created a perfect storm for fabrics prone to hydrobursts. Machinery manufacturers went to work on the issue. Most overcame the problem by programming tamps (i.e., a timed press cycle) that would pull the "ram" back a little to help distribute trapped water, while slowing down the process until the bursts disappeared.

In many cases, damage related to hydrobursts is invisible to the naked eye until after multiple washings. Then the tears become visible. Looking at a burst under

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FIGURE 1: T-180 (left) has more room for water to escape than T-300 (right).

FIGURE 2: Created hydroburst

a microscope, the condition of the torn yarn ends will go a long way in identifying a new burst from old damage. In my opinion, most hydroburst damage has some root fabric issues either in the manufacturing, type, age or normal chemical degradation from continuous washing processes.

Hydrobursts are difficult to isolate because there are many contributing factors and causes that present almost identical results. I don't know of anyone who's actually seen the creation of a hydroburst during the extraction process because it's in an enclosed vessel.

I've created a hydroburst by taking a sheet and placing a latex surgical glove filled with water, tying it off and tightly tie-wrapping it in the fabric. The sheet then was thrown into the press can on top of the load just before the ram came down.

A hydroburst also was triggered by trapping water in some fabric and dropping it from 20 ft. onto a concrete floor.

It takes a thorough examination of all processes and microscopic examination of the damage to isolate the cause of a hydroburst. There are manufacturing, cut-and-sew, equipment, chemical and operational issues that can cause or exacerbate existing problems.

New sheeting should meet the minimum industry standard of 40 lbf (pound-force) for the fabric to pass a grab sample test. A new sheet that's never been processed in a commercial laundry is drawn out very tight. It also may have sizing in it. A few years ago, our lab received some T-300 sheets that had visible bursts after only seven washings. I was stumped; the grab test (sample) showed the lowest grab was in the fill direction of 48 lbf. That's well within the 40 lbf. minimum tolerance range. So what went wrong? After a series of discussions with experts, it was suggested that we ask for a new sheet that had never been processed and do a grab test.

But first, a question: what will give you a better grab test result, a sheet that's brand new, never commercially processed, or one that's been washed 20 times?

The answer: The sheet that's been washed 20 times can give you as much as a 30% better grab. Why? A processed sheet will "draw up" during laundry processing giving it a higher thread count per inch making it stronger. The sheet also will become thicker, creating an elastic quality producing a better grab-test result. At that point, it was theorized that

the sheets were damaged in the first few washings.

SUGGESTED REMEDIES

I believe, the first step is to eliminate fabric softener from the high thread-count sheets. Overuse of fabric softener will further restrict water from passing through the already semi-permeable fabric. Second, conduct a careful examination of the laundry equipment during operation. As the yarns in high thread-count sheets are tightly woven, it restricts the water from escaping from the cake, trapping it. If the water pressure inside the small area of the fabric has an area of lower air pressure on the outside, a hydroburst will occur. Many times the damage isn't visible and may take anywhere from 5-20 washings before the weave unravels and is visible. Usually, subsequent washings have caused destruction such as fraying and mechanical damage. All of these factors will make it difficult to pinpoint the root cause.

If you find a hydroburst where the fibers in the tear look fresh as seen in the photo below, this is the sample you send to the lab. A new hydroburst will have identifying features, or "fingerprints" not seen in manufacturing, equipment and the other issues. The picture at left shows where water trying to escape the tight weave pushed the yarns apart before the larger burst below was created. This photo is perfect example of a hydroburst.

So how can we reduce these losses? Unless we can conclusively determine the initial cause of the tear, it's difficult to isolate the root problem. Typically, it starts with the hotel property blaming the laundry service. The laundry blames the chemical company, which in turn blames the equipment manufacturer, who blames the fabric manufacturer. Meanwhile the cost to replace the damaged linen adds up quickly. A court or arbiter may deem prolonged inaction by the laundry as "contributory negligence." That means you can be held partly responsible when the assignment of liability is issued.

It's critical that laundry operators and suppliers immediately stop pointing fingers! It's a waste time and will only increase the total damage. When someone has a finger pointing at them, people tend to go into a defensive crouch. Unfortunately, that position is unproductive when trouble shooting a problem. You need a team of level heads to investigate and determine the cause as quickly as possible and to arrive at a clear understanding and take steps to eliminate the problem. TS

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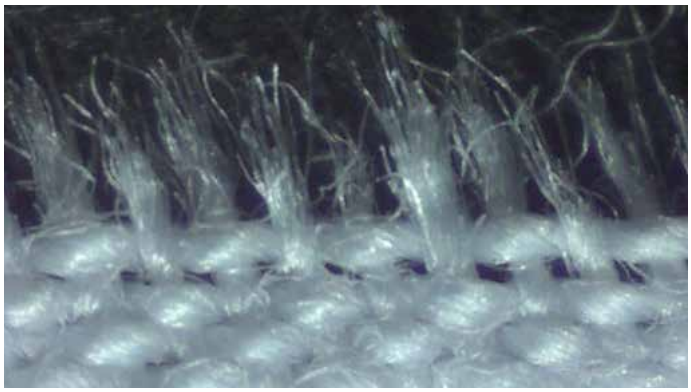

FIGURE 3: Created hydroburst at higher magnification. Note yarn ends

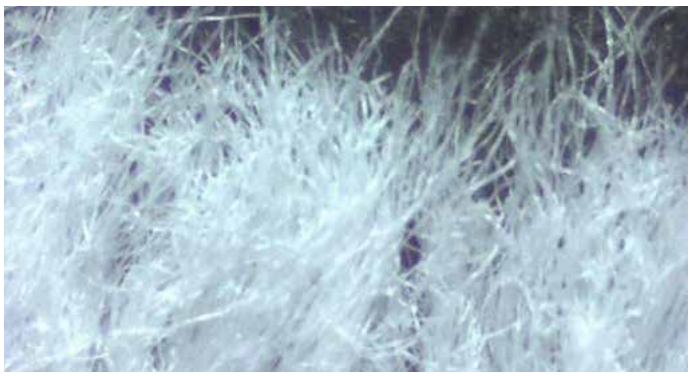

FIGURE 4: Compare yarns ends from a sheet that had been washed several times after original damage above.

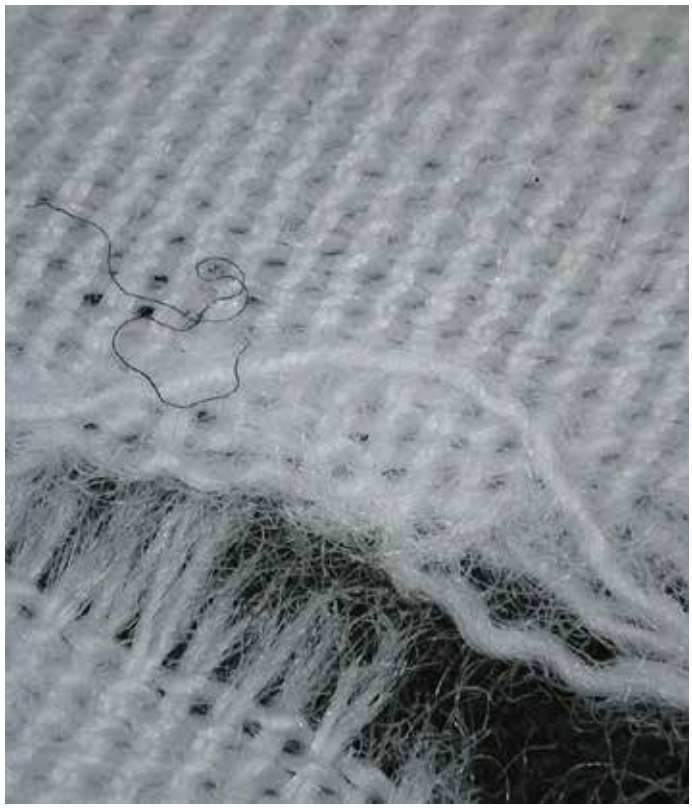

FIGURE 5: The image above shows how water seeking to escape the tight weave pushed the yarns apart before creating the hydroburst shown below.