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Dollar takes a beating - in the lab / Bureau puts newbills through the mill to simulate daily torture

By JEANNINE AVERSA
Associated Press

WASHINGTON - Andrew Wilson throws his own special load of laundry into the wash: eight white cotton terry towels, 2 1/3 ounces of powdered laundry detergent - and 25 crisp U.S. greenbacks.

Wash, rinse and spin. When the load is done, it's not the towels he goes for first.

Wilson is a chemist at a Bureau of Engraving and Printing lab that checks how dollar bills survive the torture of every day life - whether bucks are spun in a washing machine or dumped in a crumpled mass into an overstuffed handbag.

The bureau, which makes the nation's paper *currency*, tests thousands of greenbacks weekly.

The dollars are picked at random from larger batches of freshly made notes. But these bills will never make it into cash registers, wallets or handbags. Eventually, they are destroyed.

"What we do here is after the *currency* is printed, we test the *currency* to make sure it meets our specifications, which are pretty stringent," said Goutam Gupta, chief of the bureau's Office of Technical Support.

"For example, some people will frequently leave their *currency* in their pocket and then launder the clothing. So, the note actually has to survive that process," said Gupta, who holds a doctorate in chemistry.

"Is the quality good enough so that (the bill) still retains its clarity and resolution so that it looks like a nice American bank note. We run tests to simulate these actual stresses you'll see in circulation," he said.

The lab tests how well the notes hold up after indignities such as being laundered, soaked in chemicals or folded repeatedly - technically known as the "crumple" test.

All the tests are important, but it is most troubling if a bill flunks the crumple test, Gupta said. "It is more serious because people will take a note and fold it and stick it into their pocket," he said. "That is a much more likely scenario in actual use."

In that test, physicist Virgil Huber cuts a fresh \$20 bill into three pieces so it will fit into a special metal contraption. He rolls one slice like a cigarette and inserts it into the device, which squashes it into a pellet. Each crinkly wad is then carefully unfolded and examined.

A bill is tested seven days to 10 days after it rolls off the printing press to provide sufficient time to make sure "the ink is cured," said Valentino DeVito, who also holds a doctorate in chemistry and is manager of technical services.

If ink flakes off, the bill can look worn. In general, the bills hold up well because "we have very excellent ink these days," DeVito said.

The same tests are run regardless of the bill's denomination. Only one type of test is applied to a selected bill; the same note never goes through the entire battery of tests.

In the laundry test, the 25 bills, eight all-cotton terry towels and standard laundry detergent are tossed into top-load washing machine. The mix of bills and towels slosh and spin through a regular wash cycle in about 14 gallons of hot water.

The water temperature is about 142 degrees Fahrenheit, plus or minus 4 degrees. When the notes come out of the washing machine, they are air dried and then examined.

The ink on the front of the bill is more likely than the ink on the back to take a hit from the laundry test, DeVito said.

In a second test, a bill is soaked for 24 hours in a glass container filled with one of nine chemicals or solvents, such as gasoline, bleach or sulfuric acid.

Like the laundry test, the chemical soak tests rarely produce a problem with the backs of the bill.

The lab also conducts a "rub" test, using the same nine solvents. A 2-pound weight with a pad on the bottom is rubbed repeatedly across a bill that has had a solvent poured on it.

Each test has criteria for passing or failing. Most bills pass, officials said.

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RIGHT ON THE MONEY

The Bureau of Engraving and Printing produces 37 million notes a day with a face value of approximately \$696 million.

95% of the notes printed each year are used to replace notes already in circulation; 45% of the notes printed are \$1 notes.

A piece of paper **currency** can withstand about 4,000 double folds (first forward and then backwards) before a note will tear.

The 100 dollar note has been the largest denomination of **currency** in circulation since 1969.

According to the Federal Reserve System, this is the average life of a bill:

\$1 .. 22 months

\$5 .. 16 months

\$10 .. 18 months

\$20 .. 2 years

\$50 .. 5 years

\$100 .. 8. 5 years

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