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Down and Dirty with
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Perpetual apprentice,
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Jeff Patchell
in Australia

The great debate: Washdown vs. Siphonic

The conjecture over what constitutes water efficiency, with particular attention paid to water efficient toilets, has been raised since “sustainability” became a buzz word, and then a fact of life. There is a scepticism about water efficient toilets, particularly in your part of the world (North America) where a large proportion of the population feel they fail to flush as much waste down the line, and therefore don’t save water because they require double flushing.



OVERCOMING FRICTION

John Koeller and Bill Gauley’s study *Evaluation of Water-Efficient Toilet Technologies to Carry Waste in Drainlines* explained that, “Waste resting in a drainpipe will form a loose dam that will cause an upstream backup of water (and potentially more waste). The water will continue to backup behind the dam until a sufficient mass of water (and waste) is accumulated to overcome the friction between the dam and the pipe wall, thereby essentially flushing the pipe in one large surge.”

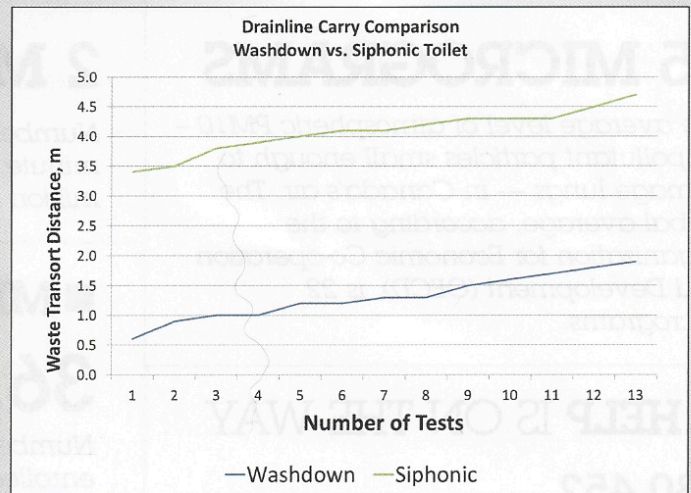
But John Koeller and Bill Gauley, of MaP toilet testing fame, report that this is one of the many myths surrounding low-flow flush technology. Another fallacy, they say, is that washdown toilets (the kind used in Europe and Australia) transport waste farther along a building drainline than siphonic toilets (the kind used in most premises in North America).

“The reasoning behind this statement is the belief that washdown toilets have a higher percentage of ‘trailing’ water [water following the waste] and a lower percentage of ‘leading water’ [water in front of the waste] than siphonic toilets,” Koeller says. “Washdown toilets quickly ‘dump’ the entire volume of flush water from the tank into the bowl and onto the surface of the water in that bowl. This ‘plug’ of water pushes the water and waste in the bowl through the toilet trapway and down the drainline. Siphonic toilets, on the other hand, use the siphonic action of water discharging from the fixture to pull

Putting them to the test

Koeller and Gauley conducted an experiment using two contemporary toilet models with the same flush volume to flush a single test specimen.

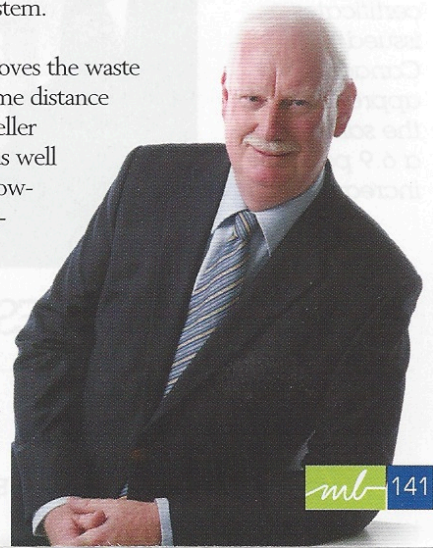
Each toilet was tested 13 times, each test using a single flush, and the specimen travel distance was recorded. The results were then sorted from shortest distance to the longest distance and plotted in the chart shown. The results of the testing did not support the belief that washdown toilets will transport waste a greater distance along a drainline. And oddly enough, the chart supports the exact opposite conclusion.



Download the full study report at: www.map-testing.com.

the bowl water and waste through the trapway and into the drainline.” Washdown theory would seem to have some merit. It has a greater volume of trailing water to push waste further through the drainline. However, no single flush will transport solid waste from the toilet to the sewer system.

“In reality, a toilet flush only moves the waste out of the toilet fixture and some distance along the drainage system,” Koeller explains. “Subsequent flushes, as well as supplemental flows from showers, baths, faucets, clothes washers, etc., help move the waste along until it ultimately reaches the sewer.”



Jeff Patchell is managing director of Connection Magazines Pty Ltd. He operates www.worldplumbinginfo.com, an online plumbing industry knowledge bank.