

WATER RESEARCH CENTRE Propelair 1.5-litre flush water closet trial

Water Conservation has been moving up the political agenda, particularly with the recent water shortages and drought orders. Part of our remit is to explore issues associated with water conservation, and what role ultra-low flush WCs could play in alleviating the problem, as a third of the water used in the home is currently flushed down the toilet – Figure 1.

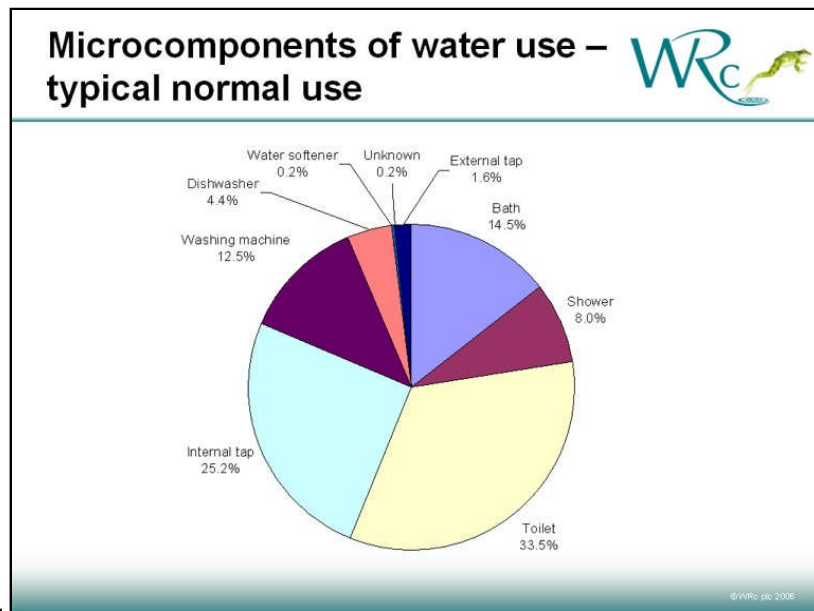


Figure 1.

At 1.5 litres per flush, the Propelair WC offers the potential to significantly reduce water demand, and we have installed two prototypes in our offices to assess the actual water savings, operational performance and gather feedback from users to ascertain acceptability. Our Identiflow system, which monitors and records components of domestic consumption, has been used to monitor the prototype trial and compare the Propelair WC with existing WCs – Figure 2.

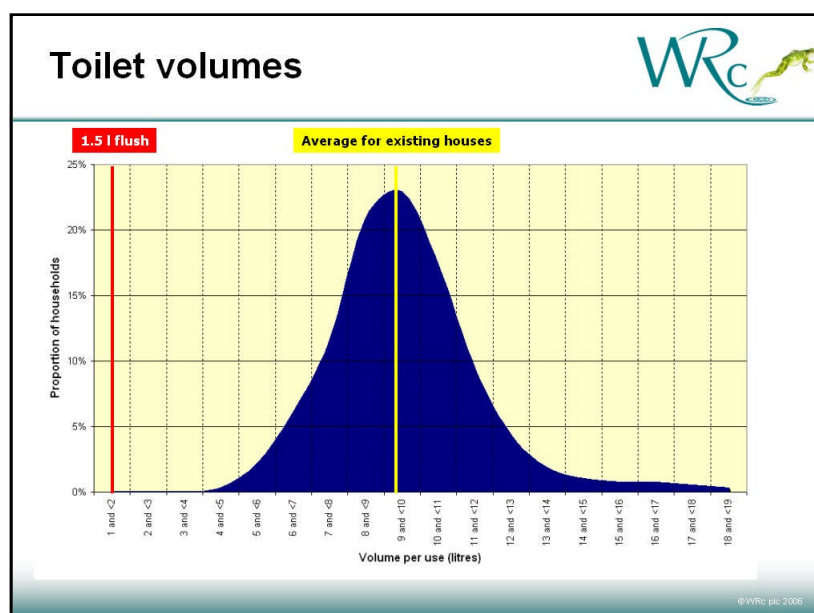


Figure 2.

The Propelair WCs actually recorded an average flush volume of 1.35 litres, compared with the 1.5 litres we expected. This represented a saving of 7.85 litres per flush over the other WCs, which averaged 9.2 litres per flush. Users reported good performance and acceptance of the new technology.

Description of the trial

The male and female toilet block comprises 5 WCs and 2 urinals connected by 100mm drains to a vertical soil stack. Toilets 'M2' and 'F3' were replaced with the prototype toilets, which connected onto the existing drains. The other fittings were untouched. The layout is shown in Figure 3.

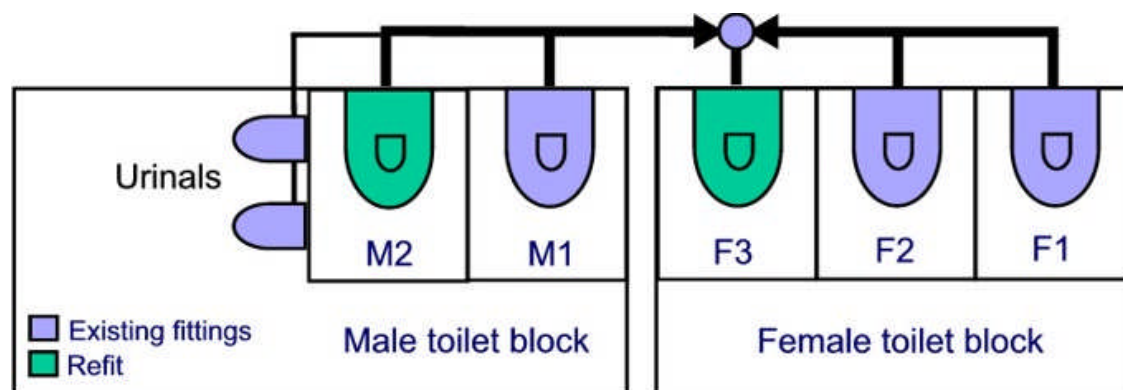


Figure 3.

Results from logging of flush information

Logging was carried out using WRc's *Identiflow* loggers, which quantified volumes of water flushed on all five toilets before the trial commenced, and after the prototype refit.

Table 1 shows the average WC flushing volumes before the trial commenced.

Pre-refit	M2	M1	F3	F2	F1
Average volume used per flush (Litres)	10.3	8.6	10.0	10.5	8.5

Table 1.

Table 2 shows summary data from toilet data logging carried out after the Propelair toilets were fitted on 7th February through to 31st March (52 days). Data for all 5 toilets has been collected. The conventional toilets have an average flush volume of 9.2L and the Propelair prototypes 1.35L. Figure 4 shows the water used in 'M2' & 'F3' before and after the prototypes were installed.

Post-refit	M2	M1	F3	F2	F1
Number of flushes	486	510	490	167	883
Average volume used per flush (Litres)	1.4	8.6	1.3	10.5	8.5

Table 2.

Results from user questionnaire

The purpose of the questionnaire was to gain information for design improvements. However, user acceptance of the existing design was good, with 93% of respondents rating the flushing performance as good, and 78% classifying the cleaning performance as good.

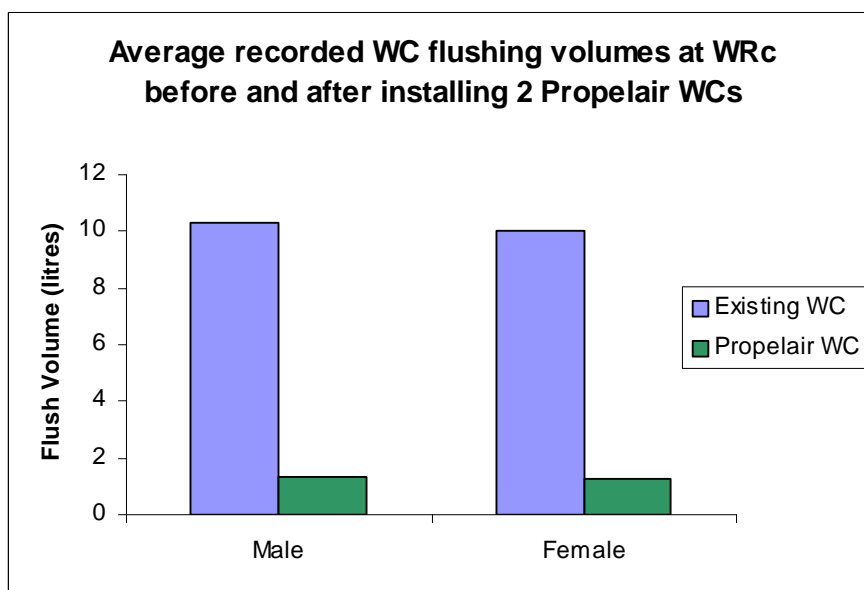


Figure 4.

	Existing WC	Propelair WC
Male	10.29	1.37
Female	10.04	1.30

Projections

Water saving projections have been carried out based on ODPM property and population figures (i.e. domestic households only, with no commercial premises) for the next 31 years. For these projections water consumption by all fixed (e.g. showers, baths) and non-fixed appliances (e.g. washing machines) have been kept constant, except for toilets. An uptake percentage for households installing 1.5L WCs has been estimated at 2.5% per year, based on a toilet replacement rate of 15 years (Source: British Bathroom Council). This gives projected savings of around 143 ML/day in 10 years time - Figure 5.

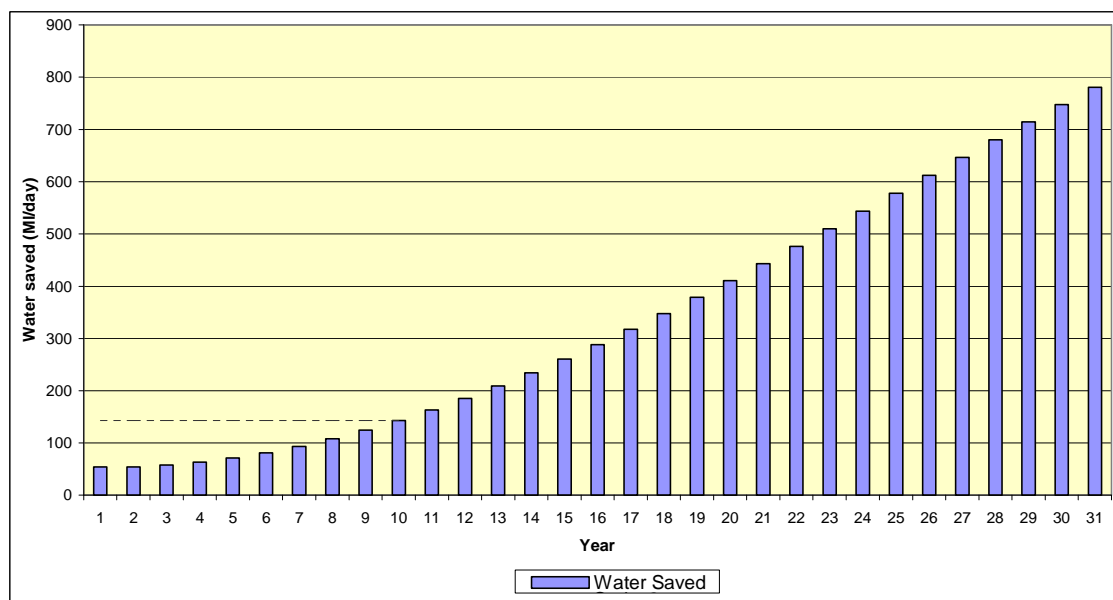


Figure 5.

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