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Drinking Water Engineering and Science Discussions

Interactive comment on "Non-residential water demand model validated with extensive measurements" *by* E. J. Pieterse-Quirijns et al.

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General remarks:

The vast majority of work on estimating peak water demands has focused on residential consumers. The authors present a new study that represents an early effort to model and validate predictions of peak water use in non-residential sectors. The findings suggest that current building design standards may be too conservative resulting in oversized pipe lines and water heaters. Right-sizing supply lines and other appurtenances has potential to save construction and operating expenses while still providing adequate service to the end users. This work is a promising start; it is hoped that additional studies are performed to corroborate and extend the findings presented here.

Specific remarks:

Pg 461 line 4 – The authors state that a value located 3 standard deviations above the sample average would "represent the 99.7 percentile". The normal distribution would give the 99.87 percentile. What probability distribution did the authors assume? What is the basis for selecting this distribution?

Pg 461 Eq (1) – Show the units associated with MMF

Pg 463 line 27 – Replace "gain" with "savings"

Pg 467 Table 1 – Define "loading units"

Pg 469-470, Table 3 – Include the sample size for the "measured" and the "SIMDEUM" results. Round the HWU results to the nearest litre.

The computer model SIMDEUM seems essential for finding maximum HWU volumes for various time periods. However, is SIMDEUM necessary to estimate the instantaneous peak flows? The authors know the number and the demand of each type of fixture in the building. From user habits, the authors can estimate the probability that an individual fixture will be in use during the peak period. With this basic information it is possible to use the direct analytical method proposed by Wistort (1995) to estimate the instantaneous peak water demand in the building. Wistort's method is an extension of the original 1940 method proposed by Hunter. It can be shown that the Poisson Rectangular Pulse (PRP) method and Wistort's method are conceptually identical and will yield equivalent results. It would be worthwhile to compare Wistort's analytical estimates for the peak demand against the SIMDEUM predictions given in Table 3.

Hunter, R.B. (1940) Methods of Estimating Loads on Plumbing Systems, Building Materials and Structures Report BMS65, US Dept of Commerce, Natl Bureau Standards, Wash DC, 23 pp.

Wistort, R.A. (1995) A new look at determining water demands in building: ASPE direct analytic method, Technical Proceedings, ASPE 1994 Convention.

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