

A comparison between the fixture unit approach and Monte Carlo simulation for designing water distribution systems in high-rise buildings

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Abstract

The fixture unit approach with an arbitrarily assumed reference flow rate is commonly used for the estimation of probable maximum simultaneous demand in many building water systems. This study evaluates such estimations for some high-rise buildings in terms of various reference flow rates. The estimation accuracies are analysed against Monte Carlo simulations with which no reference flow rate is assumed. The results reveal that the traditionally assumed reference flow rate ($10 \text{ l}\cdot\text{s}^{-1}$) for demand analysis should be increased to $250 \text{ l}\cdot\text{s}^{-1}$ for high-rise water systems in a dense built environment similar to Hong Kong.

Keywords: Demand analysis, water supply system, fixture unit approach, reference flow rate