

reductions in water use of up to 25 percent. Most toilet tanks have excess volume, and the flush can be reduced or controlled by placing plastic bottles or "water dams" in the tank, or with other modifications. Bottles and water dams maintain the static head and velocity of the water while reducing the volume.

After the General Services Administration established a water conservation standard of 3.5 gallons per flush for tank toilets, manufacturers designed and marketed toilets to meet the standard. Most toilets available today successfully use 3.5 gallons or less through modified bowl and trap designs and lower volume tanks. Limited field testing of these toilets by the Washington Suburban Sanitary Commission of Hyattsville, Maryland (WSSC) and others showed an 18 percent overall reduction in water use.

Computations based on the slope of collection line specified in the Uniform Plumbing Code (one-fourth inch per foot), show that, theoretically, a flush of two gallons will satisfactorily carry waste from the toilet, through collection lines, sublaterals, laterals and sewers. If variances from the recommended slope are permitted, the probability of stoppages is increased.<sup>7</sup>

The International Association of Plumbing and Mechanical Officials (IAPMO) publishes and maintains a list (Research Recommendations) of approved plumbing fixtures for new installation. All water saving toilets on IAPMO's list have been tested and will perform satisfactorily.

While retrofit devices may not operate satisfactorily in all conventional toilets, most will operate with less water. In Oklahoma, assuming statewide retrofitting and use of low-flush toilets in all new