ABSTRACT

Drop structures in sanitary sewer systems have always been a significant problem with respect to H2S gas and odour generation. The turbulence associated with sewer drops releases the gas, causing odour and corrosion problems within manholes and pumping stations. Vortex structures have been used for many years to control turbulence within these drop structures, with varying degrees of success. This paper will trace the history of the use of vortex structures, outline how they work and where they can be used to give the greatest benefit in the sewer system. In addition, a new design that drastically improves the odour control performance of a standard vortex system will be detailed. This new design, pioneered by staff at the Metropolitan Council Environmental Services Utility in Minneapolis/ St-Paul, U.S.A. is now being successfully employed by municipalities across Canada and the U.S. as well as in Australia.

This new vortex design drastically reduces turbulence and dissipates flow energy much like a conventional vortex drop structure, however the addition of a specially designed energy dissipating pool has the effect of drastically increasing the amount of dissolved oxygen in the sanitary sewage. In effect, the energy of the falling
sewage is harnessed and used to aerate the sewage flow, thus oxidizing dissolved H₂S and reducing or eliminating odour and corrosion. In one case, chemical costs averaging $5,700 per month were eliminated through use of the new design. Case studies from projects in the U.S.A., Canada and Australia will be presented.