عنوان مقاله:

Identification of appropriate resistance equation in analysis of water distribution networks

محل انتشار:

دهمین کنگره بین المللی مهندسی عمران (سال: 1394)

تعداد صفحات اصل مقاله: 8

نویسندگان:

Majid Niazkar - *PhD. Student of Civil and Environmental Engineering*

Mohammad Javad Abedini - *Professor of Civil and Environmental Engineering Dept. of Civil and Environmental Eng., School of Engineering, Shiraz University*

خلاصه مقاله:

Water distribution system (WDS) analysis plays an essential role in calibration, design, management, and rehabilitation of pipe networks. Head loss calculation, as an important component of pipe network analysis, can be conducted via Darcy-Weisbach (D-W), Hazen-Williams, Chezy, and Manning equations. The D-W equation is the most accurate head loss equation since unlike other resistance equations, it not only satisfies the principle of dimensional homogeneity, but also varies with pipe flow dynamics. Although the Colebrook-White formula is an accepted head loss equation, it is implicit and consequently considered to be inefficient and cost-effective in WDS analysis. In order to address appropriate selectionof resistance equation, the literature is filled up with many explicit approximate equations for which the potential user might wonder which equation to use for a certain condition. In this paper, the applicability of forty five explicit equations was compared by solving two test networks using the finite element method as solver. The results show that not only some of these equations are not reliable in WDS analysis but also they may cause converge problems. In light of the results obtained, a few appropriate resistance equations were identified to capture the dynamics of flow in an efficient way.

کلمات کلیدی:

Water distribution system analysis, Darcy-Weisbach equation, explicit head loss equation, finite element method