

The effect of excessive high-rise buildings on hydraulic performance of water distribution network for the city of Ahar

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Abstract:

Regarding the population growth and city development at Ahar city, old houses in lanes and alleys of Ahar city are changing into high-rise buildings and in most of them the regulations are violated. This issue has created a lot of problems for the inhabitants. Our aim in the present research is to study the effects of constructing high-rise buildings without observing the regulations of the comprehensive city design in Ahar city on the performance of water distribution network. Thus, the hydraulic status of the network was simulated for different conditions before and after constructions and they were assessed by using Fuzzy Reliability Index (FRI), Hydraulic Benefit In Terms of Adequate Nodal Pressure (HBNP), and Hydraulic Benefit In Terms of Satisfactory Demand (HBSD). The results showed that water distribution network of Ahar city enjoyed from a good performance after the constructions being carried out. Meanwhile, this network faced shortage of pressure in some areas before the constructions and these constructions have made the problem more severe. If the present trend in constructions violating the comprehensive city design continues, the hydraulic performance of the network will be endangered because it has been concentrated in certain areas of the city. For example, the pressure in node 56 will decrease to 6.24 m. from 22.61 m. and the areal amount of Fuzzy Reliability Index will be reduced to 0.13 from 0.24.

Key words: high-rise building construction, comprehensive city design, water distribution network, Hydraulic reliability inde