MODEL BASE OPTIMIZED SOLUTION TO ELIMINATE "NO WATER" COMPLAIN AT THE WATER SUPPLY DISTRIBUTION NETWORK OF AMPARA WATER SUPPLY SCHEME

I.L.M. Jaawahir[1], M.M.M.A. Faaique[2], A.C.A. Suja [3]

[1] National Water Supply and Drainage Board
[2] Department of Civil Engineering, South Eastern University of Sri Lanka, Sri Lanka

acasuja@seu.ac.lk

Abstract

The pipe-borne drinking water supply systems have been in operation since the colonial period in Sri Lanka. After the Independence, and with the involvement of the Galoya Development Board, the water supply system was developed covering the township of Ampara district also, and it was later taken over by National Water Supply & Drainage Board. The distribution system was extended from time to time in surrounding areas in an ad-hoc manner. There was no proper hydraulic model available to identify the sizes of pipes and capacity of storage required to satisfy the demand without any "no water" complaint. Hence, this research was undertaken to identify whether the existing system is adequate to supply water to satisfy the required demand in the Ampara region. Furthermore, this study also covered the capacity of storage tanks and sizes of pipelines required to satisfy the demand after ten years and twenty years of period. In this research, Existing pipe networks of the Ampara region were drawn in Arc-GIS and WaterGem model was developed to identify the pipe sizes and storage capacity of tanks. The results show that, since the existing elevated storage tanks are not enough for direct supply throughout the day, the network was bypassed to the pumping pipeline. Moreover, storage tanks were used as balancing tanks while introducing necessary controls. Furthermore, to maintain limited residual pressure and required flow in the system, a variable frequency drive pumping system is introduced at the pumping station and inconsistency in the network model has been improved while introducing necessary changes for physical components. The proposed physical changes are documented for construction relevant to this field in the future.

Keywords: Drinking water supply, Dynamic hydraulic model, Pipelines, Storage tank.