

Continuous water supply system against existing Intermittent Supply system

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Abstract— The declining availability of water supplies is one of the most important environmental issues facing various countries at the present time. Climate change, affluence and population growth have resulted in vast requirements of water for use in domestic, industrial and agricultural settings. Water has remained the most severe issue confronting the Urban Local Bodies (ULB), whether they are located in water abundant or water starved region. Most of the issues are related to improper operation of the system. The present water supply practice followed by Local Bodies for various towns and cities undertaking reduced supply hours is not only non-confirming to designed hydraulic parameters, but also the system is severely afflicted by adverse hydraulics leading to many of the prevailing critical issues which engages the Local Authorities in an evitable vicious circle. Serious efforts with utmost concentration ought to be the top-most priority of the Local Authority to emerge out of the severe critical water issue. Using data from the local government body, the paper presents the status of existing water supply network condition, and comparing it with continuous water supply system of selected DMA of Bhavnagar town in Gujarat (India).

Key Terms- Urban Local Bodies (ULB), District Metering Area (DMA), negative pressure.

I. INTRODUCTION

The declining availability of water supplies is one of the most important environmental issues facing various countries at the present time. In many urban areas, interrupted service, whereby water is provided to residents for a restricted number of hours per day. The term continuous water supply – refer to the supply of potable water to end users through a system of pipes-comprising interlinked bulk transmission and/or distribution system which are continuously full and under positive pressure throughout their whole length, such that the end user may draw off water at any time of the day or night, 24 hour a day, every day of the year. This is by itself an important aim for any water supply system. Uninterrupted supply has two main advantages. One is that people can draw water when they need. The second advantage is containing contamination. When pipes are empty most of time, contamination can seep in through cracks and fissures. A pipe carrying 24 hours a day, on the other hand, will not allow this as the water pressure is acting outwards. An erratic water supply is a major public health hazard as water can be dangerously contaminated each time the pipes are

empty and pollutants are sucked in. It is internationally acknowledged that the best way to keeping water safer during distribution is to ensure that it keeps flowing through the pipes on a regular (24/7) basis. While talking about intermittent supply –refer to the supply of water at regular intervals throughout the day like few hours in the morning or in the evening. An intermittent water supply is common to most of the Indian cities. The consumers are forced to collect as much water as possible during the limited supply hours. This leads to resorting to use of online booster pumps.

The objective of this paper is to determine key barrier to more effective reform and to provide pilot project to local Gov. body of Bhavnagar (Gujarat). I first provide overview about the concept of water supply in introduction (section-I). I assess the present scenario in next (section II). I reviewed case study from Bhavnagar town in Gujarat (India). Finally I drawn my literature and on my field experience to recommend direction for more effective services to be reform.

II. PREVALLING SCENARIO

It's the critical responsibility of the Local Body to supply 135-200 liters of water per head per day or say 500-700 liters of water per household every day for 365 days every year, that too with adequate pressure. In fact, the considered requirement of 135/200 liters has a break up prescribed under I.S. However to cope up with the demographic growth of the urban centers, Local bodies adopted the strategy of curtailing the supply period. Now almost all local authorities resort to curtailed supply to an extent of few hours or even few minutes for their city supplies. Also Water supply of Bhavnagar (Gujarat) is not as per the required norms. Though there is adequate raw water and treatment plant facility is available, there is lack of effective water supply system result in poor satisfaction level among the users. At present, water supply department supplies the water on basis of time of supply other than demand of users as per standards of CPHEEO manual (Gov. of India). As a result of such practice of curtailed water supply from the authorities, people try to preserve as much water that is made available to them during the supply time. This obviously results into excessive drawl of water by every household, with their taps fully open during the supply period. This practice adversely affects the hydraulics of the pipe net work. In fact, people draw water simultaneously, store in their household, and consume for 24 hours the water quantity that has been made available in short supply period. For this, they need to store, and also expend electrical energy for lifting the water to the elevated tanks of every individual household. In short,

during the curtailed supply period, there is simply transfer of water storage from municipal storage to the individual household, that too with cent percent connections open in an area.

III. STUDIES AND FINDINGS

As per the guideline not for continuous water supply by Ministry of urban development, Government of India, I have divided my area in to small District Metering Area (DMA). District Metering Areas are the basic building blocks of zoned distribution system which provide a manageable unit by which distribution consumers and performance information can be achieved.

I have used EPANET software which is water distribution modeling software developed by the United States Environmental Protected Agency for designing water distribution system. I have collected all the data from local Government water supply department for my selected DMA.

A. Hydraulic implication of intermittent/curtailed and continuous supply:

When people simultaneously draw water, there is an excessive drawl of water. This renders the discharge to be much excessive then what it was originally designed for. Demand of water Q that has been estimated to be drawn through 24 hours period, gets delivered in the short span of the supply period, which may be few hours or minutes. Any increase in discharge Q increases the hf losses or the friction losses for the same set of pipe dia and length. Result are shown in Table no. 1 and 2 for curtailed water supply and 24hour supply in selected DMA.

Populat ion	Water Dem.At 135 lcpd	Supply Duration	Lent gth Of pipe In mt.	Dia. In mm	Friction In mt.
3500	0.47 mld	45 min.	1000	200	149.83

Table. 1 curtailed water supply

Popul ation	rate of supply	water deman d	supply dur.	Length	Hf loss.
3500	135lcpd	0.47ml d	24hrs	1000M ts	0.38mts

Table. 2 24 hour water supply

The above Table no.1 and Table no. 2 shows the details of Hf losses encountered for 1 km length of 200 mm dia pipe catering to the population of 3500 at 135 lpcd rate considering 45 minutes of intermittent water supply and 24 hours water supply. The friction losses of 149.83mts.in a 200 mm dia, 1km length of pipe delivering 0.47 mld of water to a population of 3500 people during a supply period

of 45 min., whereas, the same supply delivered in 24 hrs yields friction losses of 0.38 mts in the same pipe.

IV. CONCLUSION

The intermittent water supply system almost all towns and cities are following comprises severe deficiencies which lead to poor water quality and pressures, inadequate quantity, discomfort and inconveniences, contamination etc. It can be suitably addressed by 24x7 or continuous water supply system. The present water supply practice followed by Local Bodies for towns undertaking reduced supply hours is not only non-confirming to designed hydraulic parameters, but also the system is severely afflicted by adverse hydraulics leading to many of the critical issues which engages the Local Authorities in an evitable vicious circle. Serious efforts with utmost concentration ought to be the top-most priority of the Local Authority to emerge out of the severe critical water issue

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