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Study on Implemented 24x7 Water Supply Schemes

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Abstract: ***The concept of 24X7 water supplies has generated significant interest in India. Now with the Urban local bodies, small towns are also focusing on delivering continuous water supply to every consumer throughout the day, in all the days of the year. This involves rehabilitating the distribution network, reducing non-revenue water (NRW), and introducing volumetric tariffs. By considering various problems associated with intermittent water supply schemes and the availability of water resources, continuous water supply gives more better and economical solution. The paper based on the review of two case studies of continuous water supply schemes implemented successfully in towns Malakapur and Kulgaon-Badlapur.***
Keywords: 24x7 Water-supply, Malakapur, Kulgaon-Badalapur, Water-Gem, Maharastra Jivan Pradhikaran (MJP).

I. INTRODUCTION

The supply of water in Indian towns and cities may last for just one or two hours every day or every other day; it could be even less in certain locations. The water that is supplied not potable, that is, it is not of sufficient quality to be drunk straight from the tap without exposing oneself to the risk of waterborne diseases and infections.

The supply may be of insufficient pressure to flow directly from taps even at a ground floor level, let alone taps in rooms or apartments on the first or higher floors of the building. Poor water service levels have led to consumers adopting expensive coping strategies that include installing underground storage tanks, suction pumps on water mains or overhead tanks, boiling water or using household filters. Under intermittent service, when pumping stops and the pressure in the pipe drops, water that had been leaking out of faulty joints or holes can be sucked back in.

This water could be polluted by wastewater seeping from toilets, septic tanks, domestic drains, and road drains. Intermittent water supply thus not only leads to the water provider delivering polluted water, it also leads to increased pumping costs& reduced lives of pipes due to wide changes in pressure, and an inability to know how the network is operating as meters fails to operate effectively. In addition to this, the major drawback of intermittent water supply system is, it is ineffective for supply and demand management of water.

Providing 24x7 water supply is a basic need which is a norm in the developed world. Round-the -clock water supply actually reduces water usage as people don't store and waste water.

In addition continuous water supply also reduces energy consumption at household level.24x7 supply is achieved when water is delivered continuously to every consumer of the service 24 hours a day, every day of the year, through a transmission and distribution system that is continuously full and under positive pressure throughout all of its pipelines and networks.[6]

II. NECESSITY OF CONTINUOUS WATER SUPPLY

The definition of 24x7 water supply is- "The supply of potable water to end users through system of pipes – comprising interlinked bulk transmission and/or distribution systems – 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 hours a day, every day of the year".[6]

A. Intermittent supply gives rise to the following deficiencies in the service and its management:

1) Serious risks to health, resulting from ingress of contaminated groundwater to the distribution system.
2) Inability to practice efficient supply management.
3) Inability to practice effective demand management.
4) Operational inadequacies which unduly weaken the physical infrastructure.
5) Customer dissatisfaction with an unreliable service of poor quality, and
6) Customer inconvenience, in many cases to an unacceptable degree.[6]

III. IMPORTANCE OF CONTINUOUS WATER SUPPLY

A. *It is Reliable*

The time and money spent by citizens to store water is greatly reduced by the use of 24x7 water supply. With intermittent water supply systems citizens have to spent more money on factors such as, installation of the expensive water tanks or buy water from the private sellers. Continuous water supply frees citizens from uncertainty of the intermittent supply.

B. It is Clean

Intermittent water supply creates unhealthy conditions. In intermittent water supply system, there is more chances of contamination, which affects the quality of water. Conversely in continuous water supply system water is continuously in circulation which helps to keep water safe from contamination. That helps to keep water clean.

C. It is Efficient

Throughout the world, Municipal authorities have found that continuous water supply is the most efficient and cost-effective way of supplying water. It reduces the amount of water lost in distribution and makes more of it available for supply. In the long-term, these improvements reduce operating costs, unlike intermittent supply where pumping costs are high, the durability of pipes is reduced, and it is difficult for providers to ascertain how the network is operating.

IV. REVIEW

A. *Malkapur 24X7 Water Supply Scheme*

Malkapur town is situated along NH-4, on the boundary of town Karad in District Satara of Maharashtra state.

Previously applied combined water supply scheme for Malkapur & Nandlapur village was executed in year 1988, for projected population of 14000 @ year 2010 by adopting Koyana River as perennial source. In addition to this, the extended Malkapur town area was supplied water through 11 bore wells. The rate of water supply was 40 LPCD. The above mentioned existing water supply scheme was found insufficient to cater the increased water supply need. Hence as per the demand of people of Malkapur Grampanchayat, it was decided to plan and execute 24x7 Water Supply Scheme by adopting Koyana River as perennial source. The Malkapur water supply distribution system was planned, designed, constructed and operated with following strategies taken in mind.

1) The consumer shall get the water whenever he opens the tap.
2) Provide good health to the citizens through good quality potable water.
3) Consumers pay as they use.
4) Pay at higher rate when using higher per capita water.
5) The service to work on no loss basis.[4]

The scheme for providing continuous water supply in Malakapur has been implemented on a town wide basis by the Maharastra Jivan Pradhikaran (MJP) and Malakapur Nagar Panchayat (MNP). A range of systematic interventions, management processes, human resource development, new technology, policy and financial measures, citizen friendly services, services to the poor, better coverage, communication were effectively organised and employed. They used High-Density Polyethylene (HDPE) pipes to reduce the water losses. Integrating geographical information system (GIS) based maps with household survey data and hydraulic model has been used to make use of available information for better decision-making. The projected demand for the Malakapur city for year 2037 for projected population 67196 was calculated as 70 litres per person per day (LPCD). The distribution system was divided into six zones topographically and the scheme was commenced in Aug 2008.After having agreed to the system, the distribution network was designed using "Water Gems" software. This software apart from design for steady state flow, also models the system according to the given pattern of usage of water at the different time of the day in the 24 x 7 availability. This gives the design of the system as a whole i.e. ESR and distribution network. The software uses Darwin designer which is a generic algorithm. It provides multi criteria optimization.

The criteria being performance and cost. The solutions provided by the software are ranked. This allows the user to choose the best solution which suits to his requirement of pressure and availability of money.[4]

The MJP has introduced financial innovations such as identification of all customers through customer survey, regularisation of illegal connections, volumetric tariff structure, introduction of targeted subsidies, etc. Automatic Meter Reading (AMR) with high degree of accuracy has been used to make billing system transparent. A comprehensive information education and communication campaign was also undertaken to reach out to all stakeholders and make them aware of the project objectives and benefits thus ensuring stakeholders involvement and support.[7]

B. Continuous Water Supply in Kulgaon-Badlapur

In Kulgaon-Badlapur Continuous water supply project is applied as a pilot project, using a hydraulic modelling process, to successfully provide continuous potable-water supply.

They have successfully carried out leak management, up gradation of distribution network, efficient practices and financial reforms in the pilot zone. The efforts of the Maharastra Jivan Pradhikaran (MJP) are now focused on providing continuous water supply to the entire city. Badalapur city in Mumbai has a population of 0.16 million. It has an assured water source of Ul has river. Ample water is available to meet future demand; water supply rate is 170 litres per capita per day (LPCD). The water distribution pipe network of the city was reorganised into 10 operational zones (OZs). Each OZ was further divide into three or four District Metered Areas (DMAs) with about 1,000 connections in each DMA. A property survey was carried out to determine the total number of people residing in 28,000 houses. This survey recorded the demand at the nearest node, which was then compared with the population figure computed by the density method. Using DMA methodology, Non-Revenue water (NRW) for each OZ and DMA wasa worked out. Eight out of 34 wards were selected in the first phase for the 24x7 water supply system, and the remaining wards were to be covered in two phases.[7]Distribution network has been simulated using latest Water-Gem software and hydraulic model was prepared. The data was validated and the pipe network was calibrated. The 24x7 water supply also increased the accessibility of water to poor consumers. With the implementation of this initiative, MJP states that the overall health of people (especially in slums, which constitute 5% of the population) has improved dramatically.[7]

V. CONCLUSION

Factors such as intermittent hours of water supply, high non revenue water, low metering, obsolete and faulty pipeline networks, partial operation and maintenance cost recovery for water services and poor financial health of local government bodies shows a strong need for 24x7 water supply in India. Implementation of 24x7 water supply in Malakapur town has achieved its aim as a successful pilot project. Also wastage of water is greatly reduced after implementation of the project, with the considerable reduction in operation cost of the project. Kulgaon-Badalapur also comes with successful implementation of 24x7 water supply project as a pilot project. Also it helped MJP to increase revenue and improve service delivery. In both the above mentioned projects the distribution network was developed and simulated using the latest software Water-Gem. Software uses Darwin designer which provides multi criteria optimization. Based on above experiences, it is quite evident that conversion of intermittent to continuous water supply in India is not only achievable but also affordable. Successful implementation of pilot projects for 24x7 water supply, provided key lessons with respect to improving the quality of water supply, transition to volumetric billing, metering of connections, local participation and effective communication.

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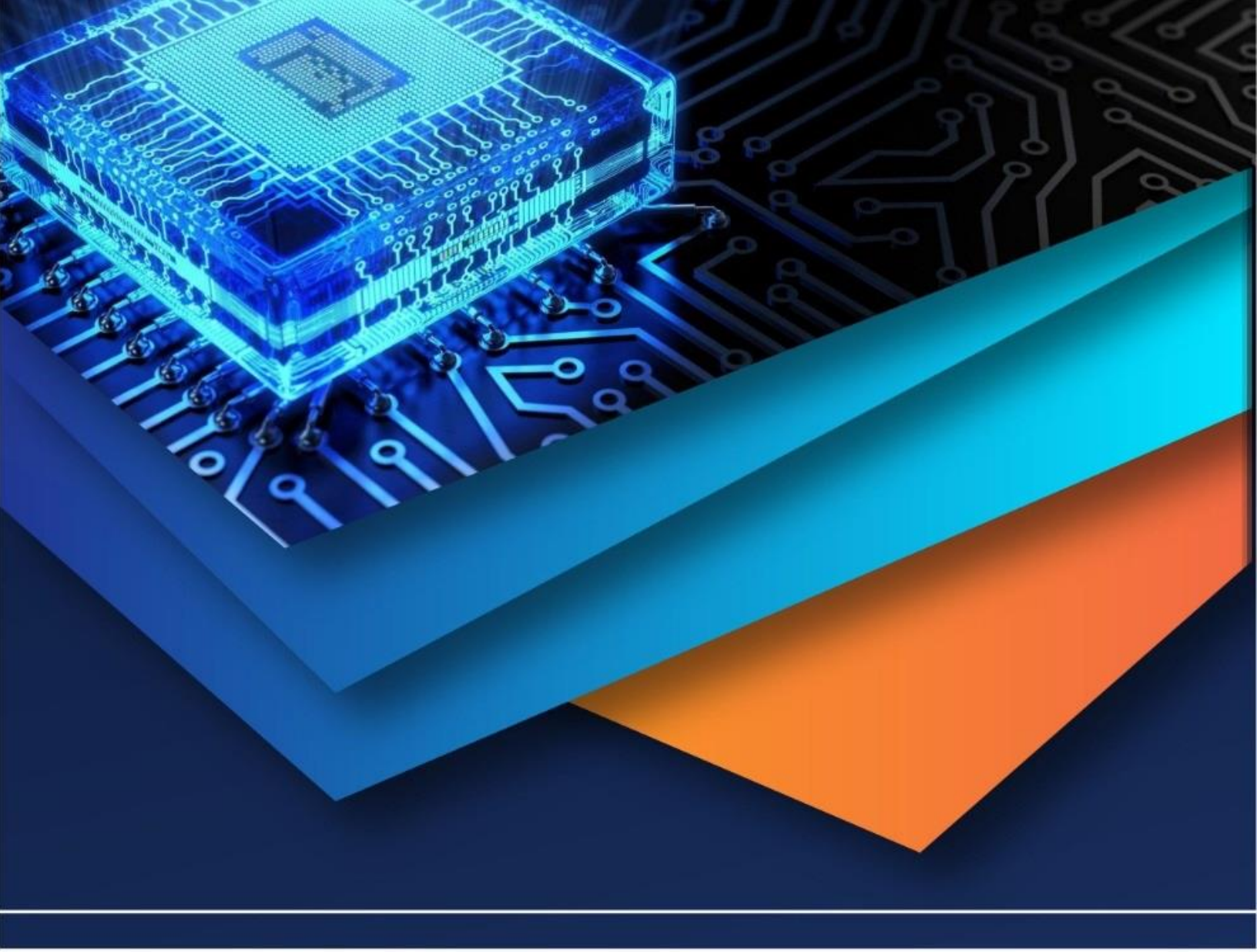

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