To Assessment of Water Pipeline System Renovation in Uttam Nagar Area, Warje Pune.

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Abstract - *This paper is based on assessment renovation parameters of underground water pipeline in Uttam Nagar Pune. This is centralised area and having better access to go any where in Pune, connected with Pune-Mumbai Express highway as well as this industrialised area too.*

This are reasons for needful future Renovation techniques in general offer pipeline operators a cost-affecting alternative to complete pipeline replacement which may be either significantly more costly, or impracticable, or both with the help of different modules. The technology has developed in direct response to the changing economic and social issues facing utilities. To identify the social issues we need to do statically analysis of population forecasting of this area and future water demand. Water demand and population forecasting is calculated from year 2017 to 2027.

Keywords: *Pipeline renewal, Failure predictions, Risk assessment, Data exploration, Assets and failure records*

Introduction

Underground pipeline is an important component of urban infrastructure which is considered city's survival and development. With fast expansion of cities, urban material flow and energy flow are increasing significantly, and the intensity and density of urban underground water pipelines are also increases dramatically. I have select the area Uttam Nagar Grampanchyat for proposal renewal of underground water pipeline. Previously this area comes under ShivaneGrampanchyat but now it comes under Pune Muncipal Corporation authentication.

The supply of water is insufficient, because as per the last senses the estimated population is different by comparing with actual population. The of variation are number of people are living there due to there personal reasons and the count of this is not consider in senses.

As per the observation every area is grow speedily when it comes under Pune Muncipal Corporation. I have study the present and future water requirement of native people in Uttam Nagar Pune. When any cities are developed then that will directly affects on the population. The rate of population is increases rapidly and it affects directly on people requirement on basic needs. It increases the demand of water per persons. To Analyse this I have done population forecasting and analysis of water demand. From this I have observed that the quantity of water supply is not satisfactory according to water demand.

Many Water pipelines are faced with the problem of pipe detoriation networks and the associated increasing costs. In response to this challenge there has been considerable effort around the world on improving practices of pipeline asset management. There has been progress in data collection and data management practices, in risk management including failure prediction models, as well as in the area of Decision Support Systems. Decision Support Systems, support long-term planning and budget settings in relation to pipeline replacement decisions.[4]

Literature Review

1.A Novel Wastewater Pipeline Renewal Engineering Cost Data and Metadata Collection and Reporting Methodology For the WATERiD Project

Stephen M. Welling[1], Sunil K. Sinha[2]

This paper summarizes the development of a novel wastewater pipeline Renewal Engineering cost data and metadata collection and reporting methodology as part of the WATERiD project, The overall objective was to collect large amounts of standardized cost data in an efficient way, i.e. leveraging the power of extract, transform, and load (ETL), a process for collecting, homogenizing, and storing data that is made possible through advanced computing power and the World Wide Web.

2. Towards Effective Prioritizing Water Pipe Replacement And Rehabilitation*

By JunchiYa, Yu Wang, Ke Zhou, Jin Huang

Water pipe failures can not only have a great im-pact on people's daily life but also cause significant waste of water which is an essential and precious resource to human beings. As a result, preventative maintenance for water pipes, particularly in urban-scale networks, is of great importance for a sustain-able society. To achieve effective replacement and rehabilitation, failure prediction aims to proactively find those 'most-likely-to-fail' pipes becomes vital and has been attracting more attention from both academia

and industry, especially from the civil engineering field. This paper presents an already-deployed industrial computational system for pipe failure prediction. As an alternative to risk matrix methods often depending on ad-hoc domain heuristics, learning based methods are adopted using the attributes with respect to physical, environmental, operational conditions and etc. Further challenge arises in practice when lacking of profile attributes.

OBJECTIVES

There are four major objectives:

Assessing current and future risk levels of a particular pipe and groups of pipes.

Investigating scenarios for risk reduction and cost efficiency of pipeline failure mitigation options, thus allowing for prioritization between pipeline replacement or pipeline management work packages.

1. Assessing current and future risk levels of a particular pipe and groups of pipes.
2. Investigating scenarios for risk reduction and cost efficiency of pipeline failure mitigation options, thus allowing for prioritisation between pipeline replacement or pipeline management work packages.
3. Exploration of pipe asset and failure data per demand.
4. Reporting capabilities allowing Water Utilities to quickly collect data for reports.

Methodology

Population Projection

Pune has developed from a quiet, peaceful educational and cultural centre into one of the fastest developing urban centres in India.

The historical population and decadal growth rates for last five decades are presented in Table-1

Table 1 - Historical population and growth rates

Census (Year)	Population	Growth Rate %
1961	6,06,777	
1971	8,56,105	41.10
1981	12,03,363	40. 60
1991	16,91,430	40.60
2001	24,07,654	40.23
2011	31,15,431	29.00

The population figures indicate consistently high growth rates have been recorded in last few decades. However the growth has shown signs of moderation in the last decade.[2]

The standard practice is to consider the average of combination of the three methods described above. The summary of these three methods and the averages are provided in Table 2

Table 2 - Summary of Conventional Methods

	A	B	C	D	E
Year	Arithmetical Increase	Geometrical Increase	Incremental Increase	(A+B)/2	(B+C)/2
2017	3,416,470	3,788,427	3,474,660	3,602,449	3,631,544
2022	3,667,335	4,459,055	3,807,356	4,063,195	4,133,206
2032	4,169,066	6,177,472	4,563,670	5,173,269	5,370,571
2042	4,670,797	8,558,126	5,441,214	6,614,462	6,999,670
2047	4,921.663	10,073,088	5,925,447	7,497,376	7,999,268

This increase in population shows that's the as per increase in population the demand of water will also increases so our aim is to check the requirements of people are satisfying or not.

After collecting information about the growth of population the next data is about the projected domestic water demand which is depends on various design stages[3]

- **Water allowance:** The domestic water allowance of 150 lpcd has been considered as per the provisions of the CPHEEO manual.

- **System losses:** The present system losses are of the order of 35%, and will be reduced to15% by the year 2027

Table 3 - Domestic water demand in Pune Municipal Corporation area

Design Year	Population	Net water demand in MLD	System losses	Gross water Demand in MLD
2012	3115433	467.31	35	718.95
2017	3918763	587.81	30	839.73
2022	4430320	664.55	20	830.69
2032	5771754	865.75	15	1018.54
2042	6939529	1040.93	15	1224.62
2047	7375348	1106.30	15	1301.53

From the results the expected water demand is shown by graphical representation.

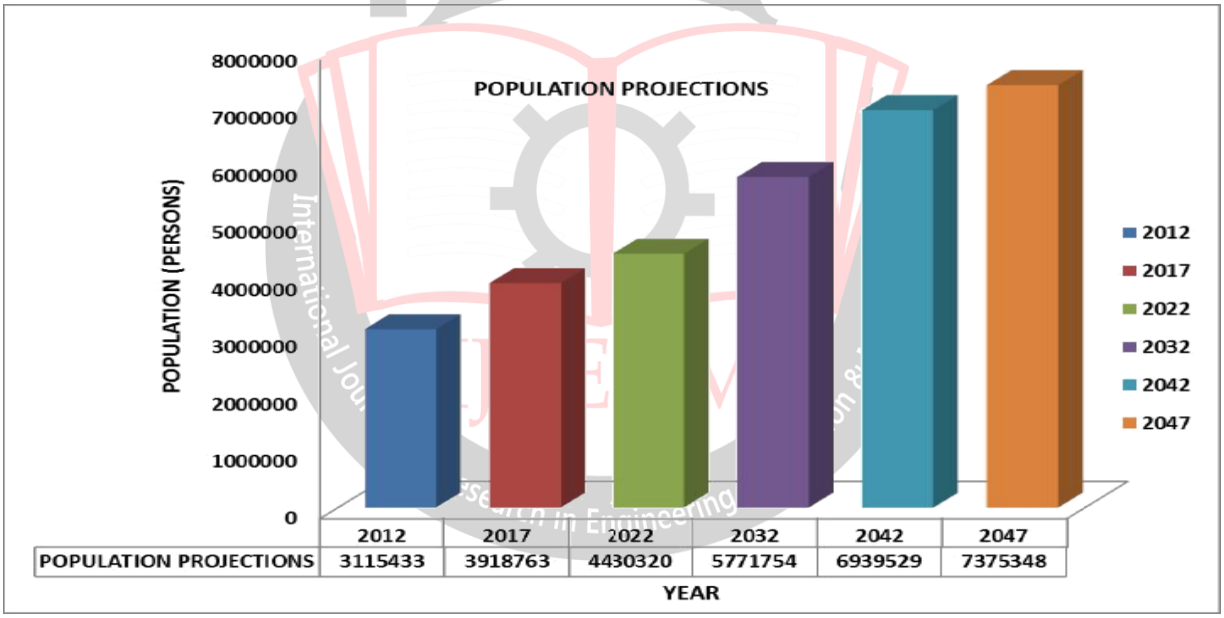

Figure 1 Population projection as per water demand

Process And Modules

For the further study I will follow the key modules within PARMS-PRIORITY are the following:

- Risk calculation,
- Failure predictions
- Cost assessment
- Scenario evaluation and
- Data exploration

There are also two key data sets

- Input data: asset and failure records
- Outputs: a range of types useful for decision making [4]

Conclusion

This work opens up a new space for the pipe failure prediction problem and asset management applications, which is different from conventional learning paradigms and worth future studies:

1) Raised in population causes unsatisfied supply through any kind of pipeline system.
2) This paper tackles the different types of failure indiscriminately since the failure type information is currently unavailable, worth further investigation will depends on availability of site.
3) Reductions in pipe repair costs: initial testing of scenarios indicate that savings superior to what is achieved with a purely reactive strategy may be achieved with a considerably smaller number of pipeline replacements.
4) The last underground water pipeline was approved in 2008 having size varies from 100 to 200 cm and as per studied population growth it is necessary to do reassessment of water pipeline to minimize the future issues.
5) It is challenging but interesting to explore if one can study area can get economical renewal of pipeline by using suitable method of rehabilitation.

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