

International Journal of Scientific Research and Reviews

Ball Device For Leak Detection In Piped Water Supply

Bhutkar Sandeep D.^{1*} and Gawande Sagar M.²

¹ME Civil Environmental Engineering, Address, ABMSP's APCOER, Pune 411009, India

²Department, Civil Environmental Engineering, ABMSP's APCOER, Pune, 411009, India

ABSTRACT

Water is an important part for all the living being to be stay on this world. But at the same time effective management of water is also important. As far as we know all there is only a 70% of total water available on this earth with which we can survive. But as the water comes from a many source up to the consumer end many leakages gets occur within that distribution system.

Leakages is a crucial issue. To resolve it there should be a proper management and conservation of water. Leakages are like a common cold. As water start flowing from the head work to the distributaries channel it starts facing a different leakages problem. It is seen that there is about 40% of leakages occurs in a distribution system.

In India Local Urban bodies facing water leakages in pipes. Due to Leaking water allow harmful contaminants through distribution network. To avoid harmful contamination of water extra disinfectant are added, it occurs corrosion of pipes. All these problems increase cost of treatment and loss of large quantity of water. To identify and cater the problems before occurs it necessary to develop the advance leakage detection system. The leakage detection device having ball in shape. It can flow in pipe with water at any pressure and provide data through device. The device is water resistance, corrosive resistance and it can flow with water.

KEYWORDS: *Pipes, Networks, Leakages, Technique, Devices.*

*** Corresponding author**

Mr. SandeepD. Bhutkar

Research Scholar,

Civil Environmental Engineering,

AnantraoPawar College of Engineering & Research,

Pune-411009, Maharashtra, India.

Email: sandeepbhutkar19@gmail.com, Mob No +91 9967694036

INTRODUCTION

Water pipeline networks are one of the modes using for distribution of water. Being a developing as India there are distribution networks which are in lakhs of kilometers. These networks run as per the topography of the terrain. If pipelines are properly maintained reduces leakages. Mostly leaks are occurred due to damage from nearby excavation, therefore it is critical to inform respective department prior to excavation to assure that there are no buried pipelines around. If a pipeline is not properly maintained, it can begin to slowly corrode, particularly at construction joints, low points where moisture collects, or locations with imperfections in the pipe. However, these defects can be identified by inspection tools such as Cathodic Protection (CP) and be corrected before they progress to a leaking stage. Many reasons for leakages include earth movement, accidents and theft etc.

The purpose of leak detection systems (LDS) is to help pipeline operators in detecting and localizing leaks. LDS provide an information display other related data to the pipeline operators in order to help in decision making. Pipeline leak detection systems are also beneficial because they can improve productivity and system reliability thanks to reduced downtime and pipeline inspection time. LDSs are therefore an important to reduce wastage of water as well as money.

OBJECTIVES

To design a device to overcome the drawbacks of existing available instruments. Analysis the reading and methodology for device in easy way. It can give actual results and readings in different material.

THEORY

As a transportation method, pipelines are becoming more and more important in many countries. Many water pipelines are being planned and constructed every year. Indian Urbanization shows expenditure on water distribution networks increasing at a significant rate.

Leak detection methods are from simple visual line walking and checking, and direct mechanical drilling to sophisticated model-based techniques. Each method has its advantages and disadvantages for locating and detecting leakages. Because leakage in waterpipelines causes much higher financial losses, mostly leak detection methods have been developed for oil and gas pipelines.

Visible and non-visible are mainly two types of Leakages. Visible leaks are the leaks that can be seen emerging from the ground or pavement. The source of the leak may be a considerable distance away from the area where it is observed. Many visible leaks are stated by customers.

Non-visible leaks include leaks that percolate into the surrounding ground and leaks that enter other conveyance facilities such as sewers, storm drains, channels, or old pipes.



Figure No. 1 Visible and Non-Visible Leakages

Pipe line leak detection following methods are generally used.

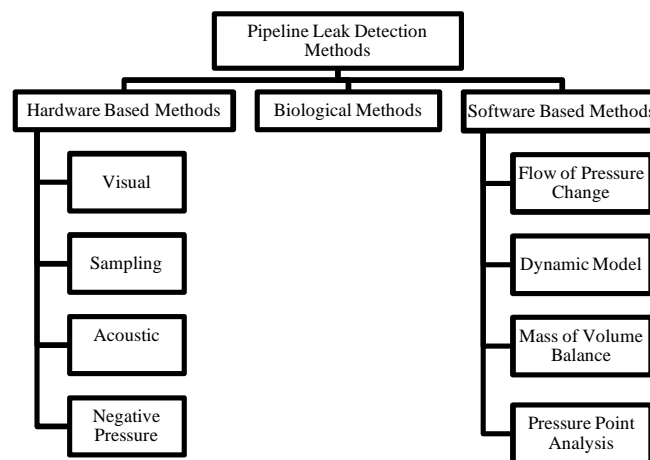


Figure No. 2 Methods of Detection

Leak detection methods used for water pipelines can be classified into the following four groups based on the device used for detection:

1. Acoustic methods;
2. Offline observation and surveillance;
3. Online pig-based methods;
4. Hydraulic methods.
5. Optical Cable methods
6. Sensor hose system

The most commonly used leak detection methods are mentioned in above. These methods are based on regular rather than continuous operation and their disadvantages lie in that fact that they are delaying to response to leakage and expensive to operate. In order to monitor a pipeline system continuously, some model-based methods, which are based on hydraulic and electronic models using system measurements as in all conditions have been developed. Many of these leak detection devices/ techniques are in a developmental stage.

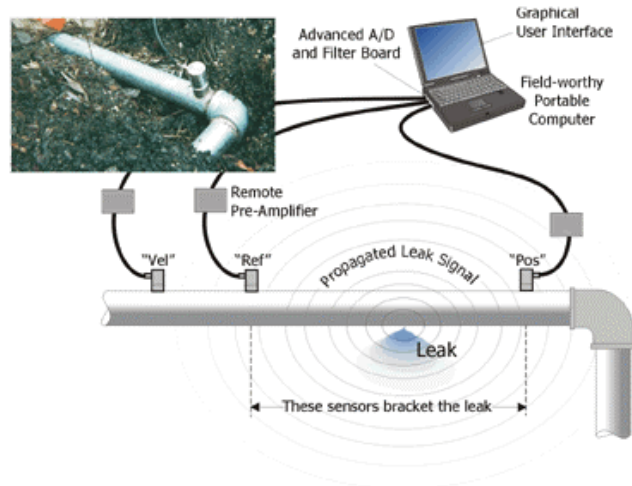


Figure No. 3 Acoustic methods¹¹

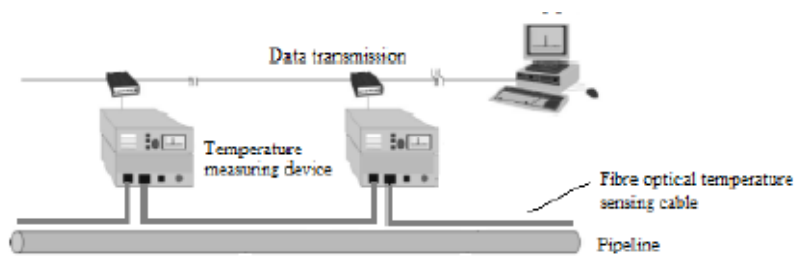


Figure No. 4 Optical Cable methods⁹

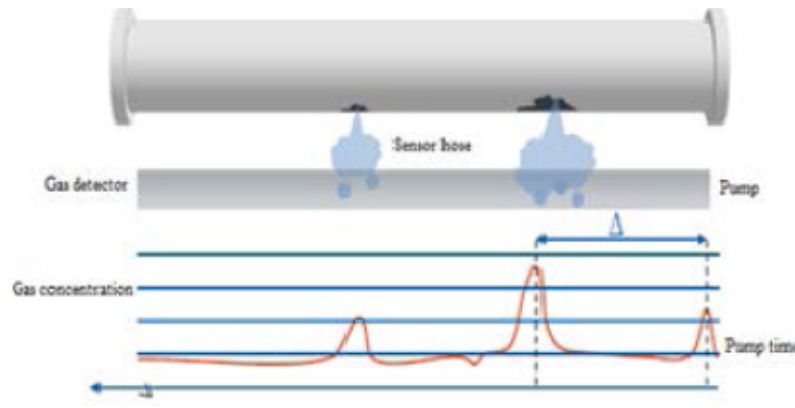


Figure No. 5 Sensor Hose System⁹

METHODOLOGY

Ball device is introducing for detection of leakages in water pipeline. The device is put into distribution pipeline. The device is flowing with water and send information on display device which is operated by checker through such electro mechanical technology which gives actual results at any depth and from any material of pipe.

The device having camera, memory card for data collection and battery etc. It also gives correct information of corrosion of pipe before leakages. Also sustain pressure of water and it should be water resistance.



Figure No.6 Ball Device¹⁰

CASE STUDY

Lots of water pipeline leakages detection methods and techniques are available. A component of detection of pipe leakages is the ability to accurately locate the leak location in pipes through minimum invasion. Therefore, this comparison and studies the leak detection abilities of the techniques and aims at determining whether these devices are actual in identifying the leakages. An experimental setup was construct to simulate the underground conditions of water distribution systems. After analyzing the experimental data, it will conclude that which techniques are effective in detecting leaks in the pipes.

CONCLUSION

Design a device for water pipeline leakage detection with the help of latest technology. It can save water as well as energy and money by reducing treated and pumped water.

The device is easy to handle and gives exact location without excavation. Also develop application which can easy installed in any mobile.

REFERENCES

1. Dr. Osama Hunaidi, October 2000 ISSN 1206-1220, Why Leakages occur in pipes and detection system Detecting Leaks in Water-Distribution Pipes.
2. N. Merzi and T. Ozkan, Middle East Technical University, Civil Engineering Department, 2014 Water Leakage and Detection in Municipal Water Distribution Networks.

3. Zvonimir Kolumbic. 4th DAAAM International Conference on Advanced Technologies for Developing Countries, Leak Detection in Underground Pipelines Of Municipal Water Distribution.
4. Jonathan Fiedler KROHNE, Inc. 7 Dearborn Road, Peabody, MA 01960, An overview of Pipeline Leak Detection Technologies.
5. Dr Jun Zhang, REL Instrumentation Limited, Manchester, UK, Designing a Cost Effective and Reliable Pipeline Leak Detection System.
6. Peter Black Pipeline and Facilities Division Scientific Software-Intercom Monarch House, Crabtree Office Village, Egham, Surrey TW20 8RY, A review of pipeline leak detection technology
7. Harrison E. Mutikanga; Saroj K. Sharma; and Kalanithy Vairavamoorthy, Methods and tools for managing losses in water Distribution systems.
8. Lawrence Boaz, Shubi Kaijage and Ramadhani Sinde
9. Nelson Mandela African Institution of Science and Technology (NM-AIST), School of Computational and Communication Science and Engineering Arusha, Tanzania : An overview of pipeline leak detection and location systems.
10. Google Images
11. Xiao-Jian Wang Postgraduate Student, Martin F. Lambert Senior Lecturer, Angus R. Simpson Associate Professor, John P. Vítkovský Research Associate, Dept. of Civil & Environmental Engineering, Adelaide University, Australia : Leak Detection In Pipeline Systems And Networks: A Review