

**IDENTIFICATION OF A METHODOLOGY FOR
REDUCTION OF NON REVENUE WATER & IMPROVEMENT OF
PIPE BORNE WATER SERVICE IN
COLOMBO CITY**

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of the Requirement for the
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Abstract

Colombo City being located in the wet zone of Sri Lanka cannot be considered a water-stressed area. However there is an ever-increasing demand for drinking water supply, due to the increase in population and the rapid development of the area. Colombo City receives 66mgd of treated water but the records could account for revenue only 30.48mgd and 8mgd as free thus showing a gross Unaccounted For Water (UFW) percentage of 42. Colombo City also recorded one of the highest percentages of Non Revenue Water (54%) in the region mainly due to the deteriorated distribution system and associated problems. Most of the pipelines in the distribution system are encrusted and experience frequent leakages which resulted in low pressure zones. This situation created consumer dissatisfaction and development restriction in the city. In this thesis the author discusses the benefits of NRW reduction the selection of appropriate methodology for water loss management and shows how such benefits can be achieved by applying the developed methodologies to a pilot area of the city.

The Author obtained knowledge of various methods by reviewing of case studies and research papers from various countries seminars and donor agencies. An analysis of the Colombo City Water Distribution System showed that 67.6% of pipes comprised with more than 60 years old, encrusted CI pipes and the major factors contributing to NRW are leakages, illegal consumption free water supply and administration losses such as estimated bills water meter errors, human errors etc.

Under the pilot scale study, initially the main causes of NRW were identified and more attention was paid to the most significant causes. After studying various strategies "part to whole method" was selected as more appropriate to reduce NRW in the pilot area. Accordingly small areas or road stretches were isolated and causes that create NRW were reduced. Implementation of this exercise to cover the entire pilot area helped to reduce NRW by a considerable quantity.

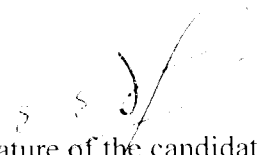
In addition to the above pilot scale study further studies were made via IWA water loss management concepts distribution management decentralization and integrated water loss management concepts, economical water loss management with or without smaller diameter deteriorated pipe replacement and improved hydraulics in large pipes preventive maintenance of distribution system and finally target setting for achievement of millennium development goals etc.

After implementation of this exercise on water loss management, it shows that fixing of responsibility with proper directions and commitment interest with awareness of all staff members top to bottom is important. to ensure positive results and to provide reliable and customer satisfactory service.

The aim of the research was to develop appropriate method with strategic framework for water loss management. The method adopted for water loss management is different from country to country city to city and place to place depending on factors such as the condition of infrastructure maintenance practices resource availability and institutional frame work etc. The short and long term strategies developed for water loss management for Colombo City could be applied to similar cities in developing countries.

Declaration

I certify that this dissertation does not incorporate without acknowledgement any material previously submitted for Degree or Diploma in any university and to the best of my knowledge and belief it does not contain any material previously published or written or orally communicated by another person except where due reference is made in the text.


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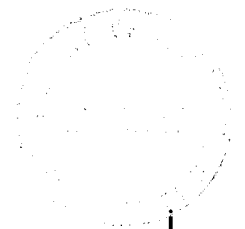
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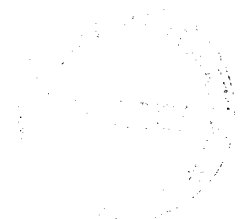
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Abbreviations

- AE - Area Engineer
- AWWA - American Water Works Association
- BS - British Standards
- CARL - Current Annual Real Losses
- CC - Colombo City
- CI - Cast Iron

CMC	- Colombo Municipal Council
CV	- Circulation Valve
DMA	- District Metering Area
EAA	- Engineering Assistants
ELI	- Economical Leak Index
GIS	- Global Information System
HDPE	- High Density Poly Ethylene
IBNET	-International Benchmarking Network
ILI	- Infrastructure Leak Index
IWA	- International Water Association
JICA	- Japan International Cooperation Agency
km	- Kilo meters
l/sec	- Liters / second
m ³	- Cubic Meter
MDGs	- Millennium Development Goals
mgd	- Million Gallon per Day
MIS	- Management Information System
Mm ³	- Million Meter Cubes
MNF	- Minimum Night Flow
NNF	- Net Night Flow
NRW	- Non Revenue Water
NWS&DB	- National Water Supply & Drainage Board
OIC	- Officer In Charge
OPD	- Operation and Development
PVC	- Poly Vinyl chloride
SLS	- Sri Lankan Standards
SV	- Sluice Valve
TG	- Tenement Garden
UARL	- Unavoidable Annual Real Losses
UFW	- Unaccounted For Water
UN	- United Nation
UNESCO	- United Nations Educational, Scientific and Cultural Organization
UNICEF	- United Nations Children's Fund
WHO	- World Health Organization