WATER DISTRIBUTION SYSTEM IN VILLAGE

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ABSTRACT

In this project, guide to safe drinking water Civil engineers and anyone else involved in any way with the design, analysis, operation, maintenance or rehabilitation of water distribution systems will find practical guidance in Water Distribution Systems. A comprehensively detailed exploration of every facet of the hydraulics of pressurized flow piping design and pipeline systems, storage issues, reliability analysis and distribution, and more. The purpose of distribution system is to deliver water to consumer with appropriate quantity, quality and pressure. Distribution system is used to describe collectively the facilities supply of water from its sources to the point of usage. Water distribution is capable of supplying water in all intended places with sufficient pressure. It should be fairly water tight as keep losses due to leakage to the minimum. To estimate the grid iron system and ring system in ulundurpet area. Finally our project is concluded to already Ring system is existed in this area, we are proposed Grid iron system to reduce the cost compared to Ring system.

INTRODUCTION

It is difficult to establish the exact degree of the importance of water to the man in his arduous climb up the ladder of civilization. It is certain, however, that without water there would be no life of any kind on earth and that, without water readily available in adequate quantity and free of pathogenic organisms, man's progress is tremendously hindered. Although no actual count is possible, billions of man – days of labour are undoubtedly lost annually because of illness and death from water – borne diseases. Unfortunately, the areas which can least afford this economic loss are the places where such sickness and death are most ramphant.

The responsibility for reducing this tremendous waste falls on governments and, specifically, on health administration. It is the aim of this monograph to assist the government officials who must meet this challenge. Among those most directly concerned are public health administrators, medical officers to health, civil or sanitary engineers engaged in public health, and sanitarians.

The purpose of distribution system is to deliver water to consumer with appropriate quantity, quality and pressure. Distribution system is used to describe collectively the facilities supply of water from its sources to the point of usage. Water distribution is capable of supplying water in all intended places with sufficient pressure. It should be fairly water tight as keep losses due to leakage to the minimum.

It has been the aim of the authors of the present monograph to consider these elements in particular relation to the establishment of services for rural areas and small communities. An effort has been made to discuss the problems of rural water-supply in a clear and realistic manner and to avoid nebulous concepts which cannot possibly apply to most of the rural underdeveloped areas of the world at the present time. On the other hand, the authors have tried to show the minimum facilities that are necessary in small communities and individual households in order to satisfy the basic personal and public health objectives of water-supply schemes. Perhaps the most important single step in a water-supply programme is to get it started: in countries where it has been possible to get a programme under way it has invariably prospered and expanded, and the result has usually been the establishment of formal government agencies to handle the work. It is of the utmost importance, therefore, that the best possible start be made. The authors have tried to examine critically many of the administrative as well as technical factors which contribute to successful programmes.

However, it has not been possible to include in a monograph of this size all the specific information available on the various aspects of the subject. Extensive detail on many subjects has had to be omitted; but sufficient reference and bibliographical material is given to permit the health officer to seek out the necessary details should he wish to do so, and to enable the civil or sanitary engineer to develop plans and mathematical designs for water-supply installations. The concepts presented in this monograph have evolved as a result of experience collected from many parts of the world.

It is hoped that this document will join WHO monographs No. 31, Composting, and No. 39, Excreta Disposal for Rural Areas and Small Communities as another link in the chain of efforts being developed by the World Health Organization to stimulate environmental sanitation programmes at the local level in Member States.

Water plays a predominant role in the transmission of certain enteric bacterial infections, such as typhoid and paratyphoid fevers, bacillary dysentery, and cholera. It plays a lesser role in the epidemiology of some Salmonella and Shigella infections and in amoebiasis, and has an indirect relationship in the transmission of such diseases as malaria, filariasis, and bilharziasis (schistosomiasis).

Water is sometimes responsible also for the transmission of brucellosis (undulant fever), tularaemia, haemorrhagic jaundice, and several other protozoal and virus infections.

DATA COLLECTION

SIZE OF PIPES

Outlet pipe	= 250mm dia
Main pipe	=110mm dia
Submains and Branch pipe	=65mm dia
Population	= 7,143

SQUARE FEET OF AREAS

Area name	Sq.ft	L Sq.ft	L m	B Sq.ft	B m
Kandha samy puram	86,400	3600	1098	1440	439
Therasa nagar	1,72,800	7200	2195	2880	878
Ambethkar nagar	43,200	1800	549	720	220
V.K.S garden	1,29,600	5400	1646	2160	659

TYPES OF DISTRIBUTION SYSTEM

Dead end system

Radial system

Grid iron system

Ring system

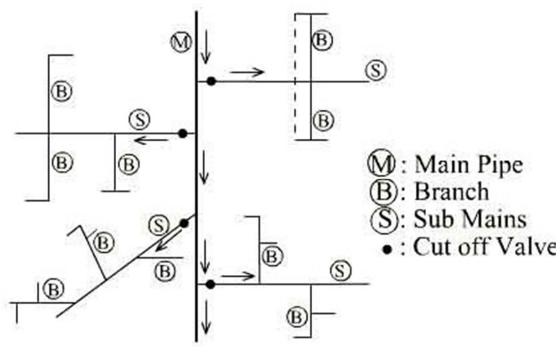
DEAD END SYSTEM

In dead end system, which is also sometimes called tree system, there is one main supply pipe, from which originates a number of submains pipes. Each submains, then divided into several branch pipes, called laterals. From the laterals, service connections are given to the consumers. A typical plan of such a network is shown.

This type of layout may have to be adopted for older towns which have developed in a haphazard manner, without properly planned roads. The water supply mains have then to be taken along the main roads, and branches taken off wherever need, thus resulting in the formation of a number of dead ends are shown.

This system is, therefore, suitable for localities which expand irregularly, and where the water pipes have to be laid at random due to the absence of any planned full fledged road network.

It is the system in which each street or block is supplied separately from the main. So there is end of system at each end of the system. This is also called dead end system or tree system.



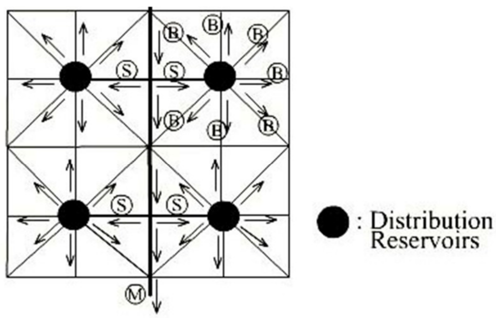
Dead End or Tree System

RADIAL SYSTEM

The area divided into different zones. The water is pumped into distribution reservoirs kept in the middle of each zone. The supply pipes are laid radially ending towards the periphery.

If a city or a town is having a system of radial roads emerging from different centers, the pipe lines can be best laid in a radial method by placing the distribution reservoirs placed at different centers, as shown.

The water is then supplied through radially laid distribution pipes. This method ensures high pressures and efficient water distribution. The calculation for design of sizes are also simple.



Radial System

GRID IRON SYSTEM

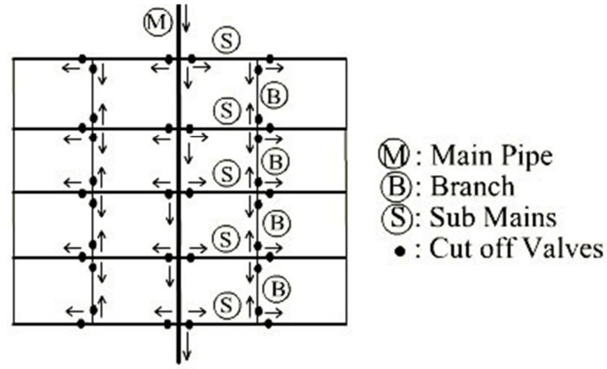
It suitable for cities with rectangular layout, where the water mains and branches are laid in rectangle.

In this system, which is also known as interlaced system or reticulation system, the mains sub-main and branches are all inter-connected with each other.

This system is more suitable for well planned towns and cities, and has been used in Chandigarh.

The principles of grid-iron system can be applied to the dead end system also, by closing the loop, and thus removing the dead ends.

In fact, in a well planned city or a town, the roads are generally developed in a grid – iron pattern, and the pipe lines in such places can follow them easily.



Grid Iron System

RING SYSTEM

This system is also sometimes called circular system. In this system, a closed ring, either circular or rectangular, of the main pipes, is formed around the area to be served, as shown in figure.

The distribution area is divided into rectangular or circular blocks, and the main water pipes are laid on the periphery of these blocks. The submains may be placed as shown.

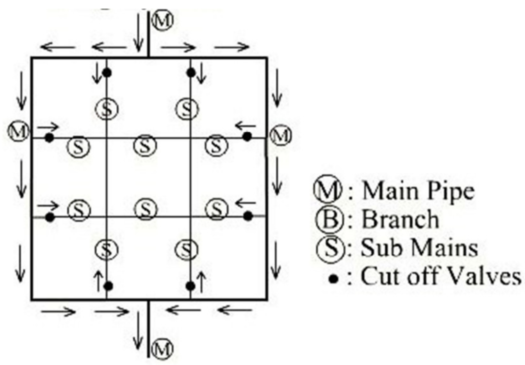
The ring system is very suitable for towns and cities having well planned roads. Sometimes, this system is used as a looped feeder placed centrally around high demand area along with the grid iron system.

In such a case, this enhances the capacity of grid iron system, and will improve the pressures at various points.

The supply main is laid along all peripheral roads and Submains branch out from the mains thus, this system also follows the grid iron system with the flow pattern similar in character to that of dead end system.

The determination of the size of the pipe is easy. The supply mains forms a ring around the distribution area.

This system is most reliable for a town with well planned streets and roads.



Ring System

DETAILS OF MEASUREMENTS AND CALCULATION OF QUANTITIES.

The details of measurements of each item of work are taken out correctly from plan and drawings and quantities under each item are computed or calculated in a tabular form named as details of measurement form.

The quantities are calculated by multiplying the values that are in numbers column to Depth column as shown below

length x breadth x depth

ABSTRACT OF ESTIMATED COST

The cost of each item work is calculated in a tabular form from the quantities already computed and total costs is worked out in a abstract estimate form.

The rates of different items of work are taken as per schedule of rates or current workable rates or analysed rates for finished items of work.

ESTIMATION OF GRID IRON SYSTEM

DETAILED ESTIMATE

S.N	ITEM	NO	L	B	D	QTY
1.	Earthwork excavation	1	29293	0.6	1	1757
2.	Sand filling	1	29293	0.6	0.1	1758
3.	Supply and Delivery of PVC pipe	1	29293			29293 cu.m
4.	Laying and Joining	1	29293			29293
5.	Refilling	1	29293	0.6	1	17576 cu.m
6.	PVC 1.02m bend with standard ISI marks special	1x 50				50 Nos

7.	PVC 1.02m L - Bow with standard ISI specials	1x50				50 Nos
8.	PVC 1.02m MTA standard specials	1x52				52 Nos
9.	PVC 1.02m PTA with standard ISI specials	1x50				50 Nos
10.	Brass gate valve 1.02m with standard ISI specials	1x12				12 Nos
11.	Providing air valve with ISI specials	1x10				10 Nos

ABSTRACT ESTIMATE

S. NO	ITEM	QTY	RATE	AMT
1.	Earthwork excavation	17576cu.m	112	1968512
2.	Sand filling	1758 cu.m	545	957020
3.	Supply and Delivery of PVC pipe	29293cu.m	175	5126275
4.	Laying and Joining	29293Rm	15	263505
5.	Refilling	17576cu.m	15	263640
6.	PVC 1.02m bend with standard ISI marks specials	50 Nos	50	2500
7.	PVC 1.02m L - Bow with standard ISI specials	50 Nos	50	2500
8.	PVC 1.02m MTA with standards ISI specials	52 Nos	100	5200
9.	PVC 1.02m PTA with standard ISI specials	50 Nos	100	5000
10.	Brass gate valve 1.02m with standard ISI specials	12 Nos	1000	4000
11.	Providing air valve with ISI specials	10 Nos	500	50000

TOTAL AMOUNT : 86,48,152

CONTIGENCIES :87,00,000

ESTIMATION OF RING SYSTEM

DETAILED ESTIMATE

S. N	ITEM	NO	L	B	D	QTY
1.	Earthwork excavation	1	40656	0.6	1	24394 cu.m
2.	Sand filling	1	40656	0.6	0.1	2439 cu.m
3.	Supply and Delivery of PVC pipe	1	40656			40656 cu.m
4.	Laying and Joining	1	40656			40656 Rm
5.	Refilling	1	40656	0.6	1	24394cu.m
6.	PVC 1.02m bend with standard ISI marks specials	1x50				50 Nos
7.	PVC 1.02m L - Bow with standard ISI specials	1x50				50 Nos
8.	PVC 1.02m MTA with standards ISI specials	1x52				52 Nos
9.	PVC 1.02m PTA with standard ISI specials	1x50				50 Nos
10.	Brass gate valve 1.02m with standard ISI specials	1x12				12 Nos
11.	Providing air valve with ISI specials	1x10				10 Nos

ABSTRACT ESTIMATE

S. NO	ITEM	QTY	RATE	AMNT
1.	Earthwork excavation	24394 cu.m	112	2732128
2.	Sand filling	2439cu.m	545	1329255
3.	Supply and Delivery of PVC	40656 cu.m	175	7114800

4.	Laying and Joining	40656 Rm	15	609840
5.	Refilling	24394 cu.m	15	365910
6.	PVC 1.02m bend with standard ISI marks specials	50 Nos	50	2500
7.	PVC 1.02m L - Bow with standard ISI specials	50 Nos	50	2500
8.	PVC 1.02m MTA with standards ISI specials	52 Nos	100	5200
9.	PVC 1.02m PTA with standard ISI specials	50 Nos	100	5000
10.	Brass gate valve 1.02m with standard ISI specials	12 Nos	1000	4000
11.	Providing air valve	10 Nos	500	50000

TOTAL AMOUNT : Rs.1,22,21,133

CONTIGENCIES : Rs.1,23,00,000

CONCLUSION

- Next to Air, the other important requirements for human life to exist, is water.
- So, providing purified water to everyone in economic way with suitable methods.
- The responsibility for reducing this tremendous waste falls on governments and, specifically, on health administration.
- It should be capable of supplying the requisite amount of water during fire fighting.
- The initial cost of distribution system should be as low as possible.
- Finally our project is concluded to already Ring system is existed in this area, we have proposed Grid iron system to reduce the cost compared to Ring system.

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