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WATER DISTRIBUTION SYSTEMS FOR THE FARM

A. G. TYLER

Everyone recognizes the value of an adequate supply of good water but few people give as much thought to its distribution as they should. The best spring or well in the world is of relatively little value if the water has to be carried to the house and the stock.

Pipes

Since water is practically always distributed through pipe it seems advisable to briefly review some of the facts about pipe and the flow of water in it. Perhaps the greatest temptation for the average individual is to use smaller pipe than he should. While it is true that small pipe costs less at first, larger pipe may be cheaper over a period of years; and what is more important it carries more water in less time. The cost of any distribution system is made up of several items of which the cost of the pipe is only one. It costs just as much to haul, couple up and dig trench for small pipe as for larger pipe. The use of small pipe in a farm distribution system is about the same as plowing two inches deep because it is cheaper.

Except for very short runs or where little water is needed one inch pipe is the smallest size that should be used. To illustrate this point, assume that the barn is two hundred feet from the pressure tank. Assume again that five gallons of water per minute is wanted at the barn, then the pressure at the barn through three quarter inch pipe will be nine pounds less than the pressure at the tank. If one inch pipe is used the loss will be only three pounds. Ordinarily such a loss of pressure might not matter but in case of a fire it is very serious.

Depth of Pipes

The depth to which frost will penetrate the ground will vary with conditions. In

the northern part of the state with the ground bare eight feet is none too deep. Under a blanket of snow and in loose soil three feet is deep enough. Under average conditions of use and soil five feet is usually safe. Frost penetrates deeper in compacted than in loose earth.

Where water pipes have to pass under paths or driveways they should be laid somewhat deeper or be protected by a wooden box or otherwise.

When laying water pipe it is a good plan to have in mind the possibility of draining the system. It is usually a simple matter to prevent sags in a pipe line. Perhaps the easiest way is to establish the grade above ground by stretching a string between suitable supports and then laying the pipe a uniform depth below the string.

Pressure

The pressure wanted will depend on circumstances but under average conditions from twenty to forty pounds is sufficient. Most drinking cups will operate on as little as two or three pounds but will work better with a higher pressure. The same is true with flush toilets, they will fill too slowly under low pressures.

Pressure may be obtained in either of two ways, by gravity or through the use of a hydro-pneumatic tank. Gravity systems produce pressure by the use of elevated tanks either in an upper story of the house, in the mow of the barn, on a hill side or a tank in the windmill tower. Each foot of elevation will produce a pressure of .434 pounds or 2.3 feet to the pound. It must be remembered that the pressure will always be somewhat less when the water is running because of the friction in the pipes, fittings, etc.

Each of the systems has its advantages. The open system (gravity) usually costs considerably less to install while the closed system (pressure) yields more water in a short time.

Storage Capacity

The size of the storage or pressure tank will be determined by several fac-

tors, kind of power used for pumping, purpose for which water is to be used and location of the tank.

If a windmill is to do the pumping the storage tank should be large enough to tide over the longest expected windless period. If dependable electric current is available small tanks are adequate. If fresh water is important small tanks should be used. When tanks are located in the house or barn, weight is a thing that must be considered. One hundred gallons of water and a tank to hold it will weight about half a ton. Ordinary building construction is too light for such a load.

Power

Windmills are, on the whole, probably one of the simplest and cheapest sources of power. The first cost is moderate, operating costs are very low and windmills last a long time. Electricity is very desirable but apt to be expensive under some conditions. Gasoline engines do very well but there are more pleasant things than starting one on a cold winter morning. If conditions are suitable hydraulic rams are cheap and dependable. Hand power will not be considered.

Laying the Pipe

Time spent in planning a water distribution system pays big dividends. Not only present but future possible needs should be considered. It is much easier to put in plugged tees when the pipe is laid than it is to cut the pipe later on. For long straight runs some provision should be made for expansion and contraction. Bends, if they can be used, are better than elbows. Suitable valves for shutting the water off from any part of the system are a good investment. Pipe can be coupled up much easier out of the trench than in it. If the last foot or so of a trench is dug with a tiling spade considerable labor will be saved.

The Agricultural Engineers at University Farm will be glad to give any information they may have on farm water supply and its distribution.