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A Technical Note on Coir-rope Filter-Points for Tube Wells in the Madras State.

by

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General: The "drive points" made completely of metal also called "Filter Points" are made in a variety of types and their choice depends upon the soil structure in the water-bearing stratum. Ordinarily an inner mesh of size 60 is used in these drive points. The generally advocated type of filter point is made of G. I. material consisting of a sufficient length of G. I. pipes of about 6 feet length and diameter 3" or 4" with holes not more than 1/2" diameter drilled on it at distances varying from 1" to 1½" centres. These drilled holes are arranged in a staggered manner and their number and size are limited so that the drive point will not lose its strength. This 6 foot G, I. pipe is closely jacketed with a 60 mesh metal cloth of either copper, brass or galvanised iron. This square mesh cloth is again covered over by a brass or G. I. perforated sheeting. Both these metal covers are welded or soldered at the top and at the bottom to G. I. pipe to avoid being torn while driving in the filter point. A solid G. I. tip of slightly larger diameter than the drive point itself, to pierce the soil and which when driven down will open up a passage way for the point, is fitted at the bottom of the filter point. On the top of the filter point, a coupling of the correct diameter is screwed and welded. The approximate cost of a 4" size metal filter point ranges from Rs. 129/- to Rs. 130/-.

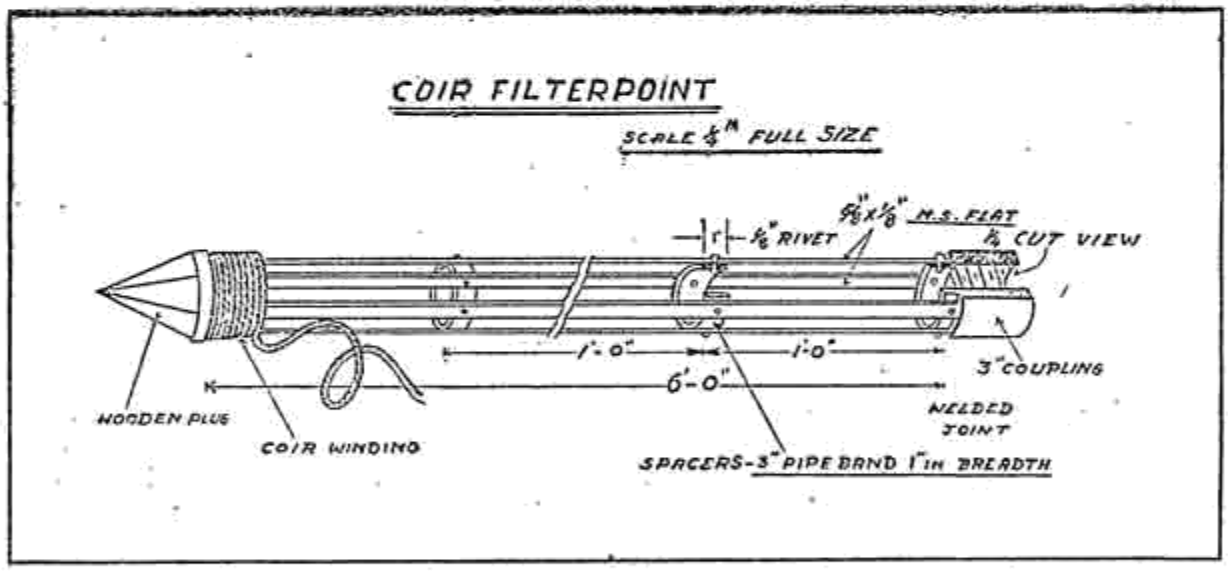
This drive point coupled with the required length of the G. I. pipes is driven down gradually till it reaches the coarse sandy water-bearing stratum and a successful aquifer is met, enabling pumping with this system.

Object: The conventional types of filter points are generally used by agriculturists in sinking tube wells for tapping underground water. These fine-meshed filter points are effective in filtering off coarse sand, dirt and sticky mud particles. But when these are driven in layers with very fine sand, dirt and sticky clay, the drive points are not so very permeable and even fail. This is because while the coarse grained layers help keep open the pores and allow the water to flow into the filter point, the fine sand and mud particles stick to the surface and choke the pores on the fine

mesh. In such places, it is necessary to have the filter point cleared every now and then by 'surging'. This is very laborious, difficult and uneconomic to be adopted by an ordinary ryot. It also needs technical skill and an ordinary ryot cannot afford to have ready recourse to such techniques.

In order to overcome these drawbacks the Department had been experimenting on modifications to these metal type filter points so that they can be manufactured at lesser cost and used in any kind of sandy layer without fear of choking.

With the above objects in view the design and manufacture of cheap, efficient and new type of drive points using flat iron and coir rope wound around in place of the G. I. perforated and metal mesh jackets, were taken up by the Department independently of any work of similar nature in other parts of India. Preliminary experiments in the manufacture of such types and field trials have so far been encouraging.



Fabrication of the Coir Rope Filter-Point: This type of coir filter point (see figure appended) consists of a cylindrical framework formed by placing six numbers of 6 foot - long mild steel flats of size 1/8" x 5/8" all round at equal distances over 1" wide circular bands of 3" diameter spacers and kept in position either by welding or by rivetting. The number of such spacers is normally 6 for 3" size coir filter points. These circular spacers are rivetted or welded at 1' to 1½' intervals along the length of the cylinder to give shape to the design of the filter point. In rivetting the flats are firmly

fixed over the circular spacers by means of 1/8" m. s. rivets. At the bottom a conical wooden plug is fitted tight with the apex pointing downwards. At top of the filter point a 3" size coupling is fixed rigidly over the top spacer and welded. For coarse sandy strata a single winding with a double twist coir rope strand will suffice, while for fine sandy layers, two windings one over the other are necessary to prevent the entry of fine sand.

The thickness of the coir rope normally used over the filter point frame may be anything between 3/16" to 1/8" or even more, depending upon the size of the filter point it self and the nature of the stratum below.

Method of installation of the Coir Rope Filter Point: The coir rope filter-point tube well is installed in the same manner as the metal filter-point tube well. In this process the outer casing pipe is first worked down into the bore with the help of augurs and sand shells and then the coir rope filter point with fittings is lowered to the required depth.

No hammering or twisting of the pipe connections is to be attempted as it will damage the wound coir rope on the filter point. Once the coir rope filter point tube well is embedded in the aqueous layer, the casing pipe is withdrawn. It is advisable to pour in simultaneously with the withdrawal of the casing. coarse sand into the space between the bore and the casing as to form a sandy layer around the coir rope filter point. This will act as a good filtering medium for the coir rope filter-point and also reduce choking of the strainer by fine sand and clay particles, in the initial stages of developing the bore.

Cost of Fabricating a3" Coir Rope Filter-Point: The coir rope filter point is cheaper than the conventional type counterpart. This can be easily fabricated and the approximate cost of manufacturing one 3" coir rope filter point may vary from Rs. 18 to 20.

The manufacturing cost of these coir rope filter-points can be reduced still further when produced in larger numbers.

A few test trials of these coir rope filter-point fitted tube wells with regular metal counterparts in the same bores have shown that the yield obtained from the coir rope filter point tube well is about 10 to 20% more than that obtained from the metal type. This extra yield can thus be attributed to the proportionately

larger pores surface area provided by the coir filter-point for the inflow of the water.

Observation of other workers on suitability of coir as filters :

(1) Experiments conducted by Dr. Mackenzie Taylor, Director, Irrigation Research, Punjab P. W. D., on the use of coir as a material for the construction of a tube-well strainer showed that :–

(i) In coir used as a tube-well strainer which was always submerged in water, there was little deterioration of the filter.

(2) The submersion of coir in water containing salts in quantities such that it is suitable for drinking and irrigation or having an alkalinity of the order usually met with will not lead to deterioration of the coir at a measurable rate;

(3) No serious deterioration of the coir need be anticipated in either alkaline or acid waters.

(4) There is little danger of coir fibre deteriorating when used as a tube-well strainer under the conditions met with in the strata.

(5) The use of coir rope as a strainer will present an almost continuous filtering surface to the water.

(6) The effective filtering surface in the case of coir being large and liability of choking less than in the slotted form of strainers the material seems to be most suitable for filtering medium.

Summary & Conclusion : From the data obtained so far from the limited number of installations and the observations on coir rope filter point elsewhere it may be summarised as follows :–

In the coir rope filter point the porosity is considerably increased. This type presents a complete filtering medium to the flow of water inside the tube well and thus enables more water to get into the column. The percentage of fine sand passing through this strainer is practically nil. No electro-chemical action is produced, unlike the metal drive points. Incrustation on the surface of the coir rope filter point by lime deposits will be nil as against that on metal strainer. There is no concentration of flow

of water in this type of filter and hence no concentration of the material around it. These coir rope filter points are found to be least affected by the prolonged immersion in underground water and there was very little deterioration even after four years of continued submersion.

The most salient feature in this type is its low cost of manufacture. For, while a coir rope filter-point of 4" size will cost approximately Rs. 25/- to manufacture, a metal type counterpart of factory make will cost anything from Rs. 120/- to Rs. 150/-.

REFERENCE

Dr. E. Mackenzie Taylor, Director, Irrigation Research, Punjab PWD. "Report on the use of coir as a material for the construction of a tube well strainer."

ERRATA

(Madras Agricultural Journal: April 1956)

Page 155, Para 4, line 4, read as 5000 lb. of green leaf, 150 lb. of ammonium sulphate and 150 lb of superphosphate,

Page 156, Para 2, under. B. line, 4, for figure 25 lb. read as total Nitrogen 55 lb.

Page 157, Para 1, line 1, add "indicate" after "Results".