

Improvement in Techniques of Reservoir Lining BSE Type of Reservoir Lining

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Abstract--There is seepage problem at intake sump/ reservoir sites due to which high amount of loss of water is noticed. BSE type of lining technique includes Bentonite powder, Sand and EPDM (Ethylene propylene diene monomer) sheet in reservoir lining. The above technique can replace SHP type lining which includes Sand, HDPE (High density polyethylene) sheet and Precast block in lining in terms of time and labour.

Keywords: EPDM lining, reservoir lining, HDPE lining, lining.

1. INTRODUCTION

There are problems occurring at the reservoir constructed in dry soil due to seepage of water into the sump through the walls as well as due to variation in water table at the base during monsoon causing over flow of water.

We also find seepage problems at the reservoir base during summer which causes high amount of water losses. Also during summer due to evaporation large amount of water is lost because of the high temperature of the area.

2. SHP TYPE RESERVOIR LINING

In SHP method Sand, HDPE (High Density Polyethylene) sheet and Precast concrete block are used.

STEP 1: Bed of reservoir is well compacted for application of sand.

STEP 2: First layer of lining consist of 100mm sand cushion. This cushion is thoroughly compacted.

STEP 3: A sheet of 250 micron High Density Polyethylene (HDPE) material is laid over sand. This sheet is 6 x 20 m in size hence they are attached by 15 cm overlapping and then welded. This HDPE layer is connected with precast concrete block.

For proper connection of different materials used the following measures are kept in mind.

- HDPE and Precast concrete block is joined with 1:6 CM.
- Joint between blocks is filled with 1:6 CM.
- Precast concrete block is made by 1:3 CM.
- Size of Precast concrete block is 450 x 300 x 75 mm.

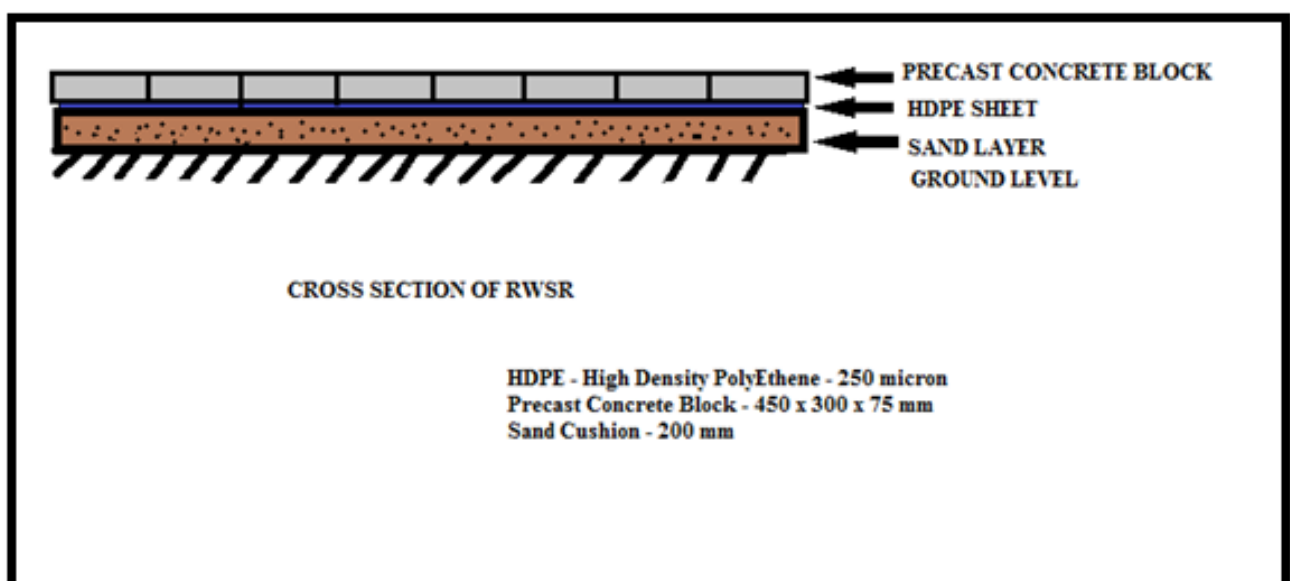


Fig. 1 Present Reservoir Bed Design(ShpType)

Merits and demerits of shp type reservoir lining:

- In SHP type reservoir lining application of High Density Polyethylene sheet of 250microns and a layer of precast blocks of size 350 x 450 x 75mm is done which may consume more time as well as money for completion of project.
- Also the chances of seepage may not be completely eliminated as the thickness of HDPE is low and the number of joints of the precast blocks being high, may cause seepage through small pores formed due to different pressures applied on it.
- This method may consume large number of labours as well as long time for the completion of the reservoir lining.

- The connection of HDPE sheet is done by overlapping and welding the sheets which needs skilled labours.

3. BSE TYPE RESERVOIR LINING

STEP 1: Proper clearing and compacting of reservoir base by use of required equipments.

STEP 2: A 20 mm dry bentonite layer by proper spreading and compacting it.

STEP 3: Application of 1mm thick EPDM(Ethylene Propylene Diene Monomer) sheet over bentonite. The small sheets of EPDM must be attached using quick seam tapes for preparing a layer over reservoir base.

STEP 4: A 100mm sandlayer for avoiding uplift of EPDM sheet.

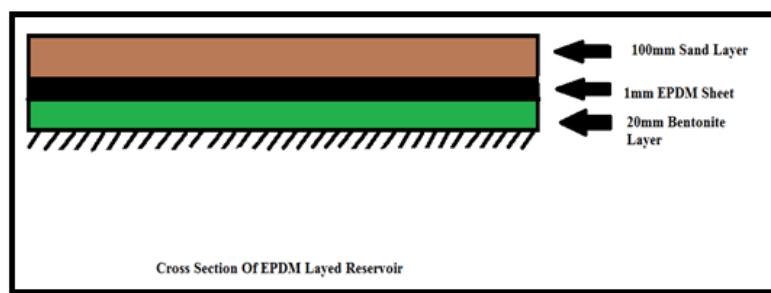


Fig. 2 New Reservoir Bed Design(Bse Type)



Fig. 3 Shp Type Reservoir Lining



Fig. 4 BSE Type Reservoir Lining



Fig. 5 Merits/Uses of BSE Type Lining

4. CONCLUSION

- By using EPDM lining we can increase the speed of reservoir lining.
- This will increase the capacity of reservoir up to 7MGD due to elimination of precast block.
- There will be reduction in requirement of manpower and skilled labours for laying of precast blocks as well as welding of HDPE sheet.
- The time of manufacture, curing and cost of transportation of precast block is being eliminated.
- The connection of EPDM sheet is done by attaching it by quick seam tape which can be done by unskilled labours.

REFERENCES

- [1] www.sealeco.com
- [2] www.allsealsinc.com/oilseals.html
- [3] Flexible membrane cover & lining for potable water reservoirs – Williams Smith
- [4] Reservoir Engineering - Edward M. Gosschalk
- [5] Water Supply Engineering– Prof. A.K.Jain
- [6] Treatise on EPDM – Ravishankar P.S
- [7] Organic Chemistry Principales and Industrial Practise - Green, Mark M, Wittcoff,Harold A(July 2003).
- [8] Elastomers – Louie,Douglas K.
- [9] Handbook of sulphuric acid manufacturing –Richmond Hill,Canada
- [10] Bentonite – Wyoming Geological Survey
- [11] Formation and properties of Clay Polymer Complexes – Theng B.K.G
- [12] World Mineral Productin 2007-11, British Geological Survey,Nottingham England