24th WEDC Conference Islamabad, Pakistan, 1998

SANITATION AND WATER FOR ALL

Application of intake/dynamic filters in Sri Lanka

J.M.J.C. Jayalath, G.E. Amirthanathan and J.P. Padmasiri, Sri Lanka

THE INTAKE/DYNAMIC filters, as pre-treatment systems are very appropriate technology in rural water supply schemes. The application of these filters in Sri Lanka has been limited due to lack of awareness and experience. Since the performance of these filters depends on the quality of raw water, a pilot plant study was carried out in a water supply scheme to assess the suitability of filters in application with raw water having a large variation of turbidity. The source was an 8-km long Hydro-Power tunnel, which carries the water of Mahaweli River. The same river water is being used for several water supply schemes in the up country. Another intake filter, which is being used with a mountain stream having low turbidity with occasional short peaks was also tested to compare the results.

The filters were tested for turbidity and suspended solids for different filtration velocities. The percentage turbidity removal of the pilot filter was about 25 per cent at high turbidity and about 70 per cent at low turbidity. The existing intake filter with mountain stream has shown the opposite results to the pilot filters. Therefore this results shows that the Intake/Dynamic filters are very much suitable and efficient in turbidity removal for low turbid streams with short peaks. Since these filters remove considerable amount of suspended solids even at higher turbidity, these filters can be used with another pre- treatment system for high turbid water.

Introduction

The Intake/Dynamic filters are very appropriate pre-treatment systems for rural water supply schemes. In an earlier studies done on an intake filter (Jayalath et, al, 1996), it was found that these filters are performing very satisfactorily when used in low turbid sources with occasional short peaks. Therefore a similar pilot test was carried out with a high turbid source to assess the suitability of application of such filters in high turbid water.

Method

The experimental filter shown in the Fig I was constructed and tested with river water having a large variation in turbidity and suspended solids. A similar type existing intake filter in a mountain stream having low turbid water

Figure 1.

Table 1. Average percentage removal of turbidity at different filtration velocities

Figure 3. Removal of suspended solid

Figure 3. Removal of turbidity

Figure 4. Removal of turbidity of existing intake filter

was also tested to compare the performance. The filters were tested for different filtration velocities from 0.4 to 3.8 m/hr.

Results and discussion

According to the table I and Fig. 2., it is economical to keep the filtration velocity between 1.0 and 2.0 m/h. The fig. 2 shows a declining trend of percentage removal with the increase of influent turbidity and that in fig. 4, shows an increasing trend. This different behaviour may be due to the dilution effect within the filter during short peaks. This dilution effect is an advantage for the secondary treatment system.

The removal of suspended solid increases with the increase of turbidity (Fig 3). Therefore, the overall percentage reduction in solid matter, turbidity and suspended solids, would have a minor effect on influent turbidity and is about 40 per cent. According to the experience, the intake filters operating at 1.0 m/h with post chlorination are sufficient for low turbid sources with occasional short peaks for rural water supply schemes.

Conclusion

Intake/Dynamic filters are very effective in turbidity removal for low turbid water with short peaks and can be used directly with slow sand filters.

In high turbid river water, an additional pretreatment system should be used before slow sand filtration.

It is economical to use filters at filtration velocity between 1.0 and 2.0 m/h.

References

MARTIN WEGELIN, S*urface Water Treatment by Roughing Filters*, SANDEC Report No 2/96, 1996

JAYALATH, et, al, *Gravity Roughing Filter for pretreatment,* 22nd WEDC conference proceedings, pp271, 1996

J.M.J.C. JAYALATH, National Water Supply and Drainage Board, Sri Lanka.

G.E. AMIRTHANATHAN, University of Peradeniye, Sri Lanka.

J.P. PADMASIRI, National Water Supply and Drainage Board, Sri Lanka.