

VI CONCLUSION

The studies have demonstrated the high rate capability of the inclined tube settler made from galvanized steel and asbestos cement corrugated sheets, ones of the locally available material which can be found easily in Thailand. The shallow settling depth provided by the tubes permit efficient clarification at detention times substantially less than those used in conventional clarifiers. From the experimental results the following conclusions can be drawn:

1. The operation of inclined tube settler made from corrugated sheet show that an angle of 60 deg. provides continuous sludge removal while still allowing the tube to function as an efficient sedimentation device.
2. Three levels of the tube under study size has little effect on the settling performance at the same flow rate of tube. Therefore for saving the cost of tube settler medium galvanized steel and asbestos cement corrugated sheets are recommended in practical design.
3. There is no reliability in settling performance for tube length of 1 ft. Good settling performance occurs when tube length is above 2 ft. In practical design tube length of 2 ft. is recommended for the purpose of minimize depth of sedimentation tank.
4. The results indicated that for medium galvanized steel corrugated sheet of 2 ft. long. The percentage of turbidity removal was more than 90 percent at overflow rate of 2-3 gpm./sq.ft. ($5.0 - 7.5 \text{ m}^3/\text{hr.} - \text{m}^2$), with raw water turbidity of 60 FTU. For asbestos cement corrugated sheet of 3 ft. long, at overflow rate below 2 gpm./sq.ft. ($11.25 \text{ m}^3/\text{hr.} - \text{m}^2$), percentage of turbidity removal was more than 90 percent. For tube length of

3 ft. turbidity removed was more than 90 percent at overflow rate below 4.5 gpm./sq.ft. ($11.25 \text{ m}^3/\text{hr.}\cdot\text{m}^2$) for medium galvanized steel corrugated sheet and below 3 gpm./sq.ft. ($7.5 \text{ m}^3/\text{hr.}\cdot\text{m}^2$) for asbestos cement corrugated sheet.

5. There is almost no different in percentage of turbidity removal at the same flow rate when comparing medium galvanized steel to asbestos cement corrugated sheet.

6. From this study, it is recommended that in practical design V^2R/L should be kept below 7.5×10^{-7} for tube 3 ft. long and below 6×10^{-7} for tube 2 ft. long, the corresponding turbidity removal is above 90 percent.

7. It was found that flocculation was achieved in the tube as a result of solid contact between smaller floc and sludge blanket of highly concentrated solid which formed in and beneath the tube. This phenomena suggests that external flocculation requirement can be reduced significantly.

8. In practical design for galvanized steel one has to consider the problem of corrosion when it was operated for a long time.

9. The experimental result that the maximum possible detention time used in this study is 10 min. In practical design this detention can be minimized to as low as 10 min.