CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The following conclusions can be drawn from this research:

1. Increasing L/D, and ΔT, and decreasing D/d, increase the efficiency of the storage tank. In this experiment, a reasonable L/D is between 3 and 7, D/d between 6 and 9, and ΔT is as large as possible.

2. Increasing flow rates, the storage tank performance is lower where the effect of mixing becomes evident. The experimental result shows that Reynolds number should not be over 8,993.

3. The water inlet location is very important. It can reduce thermal stratification and stability rapidly. It is due to the buoyancy effect.

4. The effect of heat conduction through the tank wall is negligible in this experiment (Γ = 0.2543-0.3320). However this effect can contribute to more than 10 % lower in efficiency if the wall thickness aproaches to infinity.

5. Theoretical model study (Eqs. 1, 2, and 3) suffices for the general application if $\Gamma < 0.2$, and inlet water temperature is lower than the stored water.

6. The axial dispersion is definitely important.

Recommendations

From the results of this experimental study, the following recommendations are suggested:

1. To impreve the performance of a storage tank with small inlets and high flow rates, distributive devices should be used to produce a very thin mixing layer.
2. Water inlet port should be placed where the temperature of the cold water is nearly the same as the storage water in that location.
3. Further investigation should be made on the transport of heat via the tank wall. This can be done by proposing the different types of metalic wall, and various thicknesses.