

Special Research Project Title	Feasibility Study of Water Loss Reduction for Cooling Tower System of Petrochemical Plant
Special Research Project Credits	6
Candidate	Mr. Thanasan Tangchaksuwan
Special Research Project Advisor	Assoc. Prof. Dr.Thongchai Srinophakun
Program	Master of Engineering
Field of Study	Chemical Engineering
Department	Chemical Engineering
Faculty	Engineering
B.E.	2554

Abstract

Water consumption is an important problem of Rayong Olefin Company (ROC) plant. The cooling tower system is a major unit which consumed freshwater 668 m³/hr(59% of total fresh water). The aim of this work is to perform a feasibility study of the water loss in cooling tower system. This water loss in the cooling tower system can be identified in 3 parts: evaporation loss, drift loss and the other loss. The unavoidable evaporation loss, the main loss of cooling tower, is estimated from Poppe model. The drift loss and other loss can be predicted from the total water loss and evaporation loss. With the evaluation of each type of water loss, the water loss reduction is studied by finding a scenario for reducing and prevention with the determination of all part of water loss. Then the proposed scenarios for reduce and prevention are proposed. The evaporation loss can be reduced by using a hybrid cooling tower system and replacement heat exchanger utilized by cooling water to air cooler. The drift loss is a significant problem in the cooling tower system in ROC due to the poor efficiency of the drift eliminator and the high air velocity in the cooling tower. This loss can be reduced by the replacement of a high efficiency drift eliminator. The other loss occurs due to many reasons such as water splash out from the basin, and air carry the water droplet at a size of cooling tower. This loss can be reduced by installing inlet air louver in order to prevent air carrying water droplets at a size of cooling tower. The economical evaluation of each method is also presented in this work.

Keywords: Poppe model / Evaporation loss / Drift loss / Drift eliminator