

ABSTRACT

In the utilization of energy, one of the most important components is energy storage, because its function to minimize energy lost from tank, so that later can be used. It is necessary to design a good energy storage, in this study have been designed a hot water tank can withstand the hot temperature in the water in it to stay high, the principle is adding a heat insulator to the hot water tank wall, because adding bad material to the wall tank can expected to keep the heat inside of the tank. In this study, the simulation is done in the form of analytic and numerical calculations, and then compared both results of both methods. The analytical simulation method done by using software Comsol Multiphysics 4.3, while numerical method is done with manual calculation using the empirical equations in Microsoft Excel and R Gui 3.4.2. At the beginning, we did an isolator experiment using Rockwool Cladding Roll and Glasswool Quietel with variations of thickness of 1 cm, 1.5 cm and 2 cm, and each type of isolator is simulated for 18 hours with the assumption that the tank holds the heat from 3 pm to 9 am. The results of system simulations for both methods is the temperature of the water after 18 hours with the initial water temperature constant at 80 °C. The results of simulation compared between analytical method and numerical method. Error result of analytical method and numerical method is < 7%. In 18-hour simulation work time and simulation results are compared in celcius degree and steady state temperature of 23.3 °C.

Keyword: *energy storage, analytical method, numerical method, simulation, isolator, Rockwool Cladding Rool, Glasswool Quietel, comsol Multiphysics, steady state.*