P-ISSN:1979519X
International Conference LabMa Scientific Fair 2021, Yogyakarta E-ISSN: 27458733

FUEL OPTIMIZATION ON FURNACE DEBUTANIZER REBOILER USING SYSTEM DYNAMICS MODELLING METHOD

*Rizky Restiana

Departement of Industrial Engineering, Islamic University of Indonesia, Yogyakarta, Indonesia
**(rizkyrestiana12@gmail.com)*

ABSTRACT

The process of processing crude oil requires a furnace that serves as a "cooking" crude oil to a set temperature point which will then be processed further with other devices. The heating process by furnaces needs to be considered four variables, namely temperature, pressure, flow, and fluid level. To support these variables, parameters are needed that support in fulfilling the crude oil heating process. Inefficient operation of furnaces becomes the most important thing in the use of large energy. Increased efficiency is the best option so that energy use can be minimized. This research aims to find out the optimization of furnace debutanizer reboiler by using system dynamics method. The data needed in the study are supporting parameters such as excess water, fuel flow, fuel pressure, fuel temperature, and fuel gas temperature. The data is known to be related to each other and reciprocity by using the help of causal loop diagrams. If the concept has been in accordance with the causal loop diagram that has been created then perform the implementation on the flow diagram. To run simulations with system dynamics methods, equation mathematics is required. The output of the system dynamics simulation is a graph to perform the analysis. The results of this study found that fuel needs increase by 500 kg for one month. The increase was caused by excess water levels reaching 1.5%. While excess water is caused by the loss of oxygen levels in the furnace during the heating process by 0.33%. Therefore, the percentage of furnace optimization does not reach the maximum limit of 87.35%. In order for furnace optimization to be within the optimum limit, there needs to be a hold of oxygen levels in the furnace. By holding oxygen levels, the temperature in the furnace is stable.

Keywords: System Dynamics, Simulation, Optimization