

## **ABSTRACT**

*one of the important things in order to design hydraulic structure is design flood plan, which is then presented in the form of Synthetic unit hydrograph. One of the commonly used for Synthetic unit hydrograph is SUH Nakayasu, which has been developed based on the approach developed environmental conditions in Japan. Otherwise, empirical approach need to be test, so to apply SUH Nakayasu in Sub Watershed of Biyonga Kayubulan need to be optimized in order to give accurate results.*

*Straight Line method can be used to separate the base flow and the runoff. from Rain data recording hourly from ARR can be used for calculated effective rainfall with the equation  $\phi$  index. Collins method is used to direct runoff hydrograph, and Rain Effective, reduced to the observation unit hydrograph. SUH Nakayasu be tested optimization of the observation unit hydrograph. if the test results show a big difference, then use Microsoft Excel-solver for constant optimization SUH Nakayasu*

*unit hydrograph observations on sub watershed Biyonga Kayubulan had Time of Peak (TP) 4,5 Hour with Peak Discharge (QP) 2,81 m<sup>3</sup>/sec, while from SUH Nakayasu, has TP 2,87 Hour with QP 4,25 m<sup>3</sup>/sec. suitability test results showed SUH Nakayasu better than before optimized. which pre-optimized CE value was 0.09 and after optimized is 0,90. EV value pre-optimized was 3,58% and after optimized is 7,61%. results also showed that pre-optimized is the value of EQP is 51,29% with a value of AETR is 1,63 hours, and after optimized EQP value is 0% with a value of AETR is 0 hour.*

**Key word: Hydrograph, SUH Nakayasu, Calibration**