OPTIMIZATION STUDY OPERATIONAL OF SENGGURUH DAM FOR WATER POWER PLAN

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ABSTRACT

Sengguruh Dam is located in the Village Sengguruh, Kepanjen, Malang, East Java Province. Sengguruh Dam get water supply from the Amprong River and Lesti River which both of them are upstream components of the DAS Brantas. In earlier, Sengguruh Dam was planned as hydroelectric (hydropower) for peak load and as sediment controller. In early project, hydroelectric power of Sengguruh was able to generate electricity about 29 megawatts (MW). The output of electric power could contibute electric power supply during peak load demand about five hours, since 17:00 o'clock until 22:00 o'clock in East Java.

Because of the growth population and human activities, many land use changes in River Flow Area (DAS) Brantas especially on Lesti River Flow Area and Amprong River Flow Area. The impact caused by the changing of land use at Bedungan Sengguruh, occurring large differences in inflow discharge (fluctuations of inflow discharge) in rainy season and dry seasons so that outflow discharge which is produced for hydroelectric is getting fluctuated and reduced the electricity power which is produced by hydroelectric of Sengguruh. The output from Sengguruh hydroelectric currently decrease more than 50% from 29 MW to 12.5 MW with only one turbine and generator that
works in the dry season. So, there should be a study on the optimization Sengguruh Dam for hydroelectric power.

In this study, analysis of optimum discharge and discharge for hydropower using trial error by Mass Curve Method and Mass Curve Volume due to active volume of Sengguruh Dam. Output of this calculation is hydroelectric power produced per day, also comparison tables and chart of power between after optimization with current hydroelectric power.

From the analysis of water balance and the calculation of electric power, hydroelectric power produced increasingly than the current hydroelectric power from 29.000 KW to 32.082 KW.

**Keywords**: Dam and Hydroelectric of Sengguruh, fluctuating inflow discharge, optimum discharge, electric power.