Simulasi ketersediaan air waduk sermo untuk air minum pada kondisi existing dan setelah mercu pelimpah ditinggikan

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Abstrak

Sermo Reservoir has been useful for irrigation and power plant. Despite its good reservoir management the reservoir spills millions of cubic meter of water yearly. On the other hand, there is a need for domestic water for surrounding area that can not be met. It indicates that the reservoir capacity needs increasing. The combined spillway (Free flow spillway and siphon) has been studied where higher capacity of water storage may be attained without increasing the dam crest. This is conducted by increasing the crest of the open type spillway (for examole ogee) to a certain height and at the same time adding the capacity of the open type spillway with spion. At certain height above the open spillway crest, the siphon is priming to add the discharge out from the spillway and hence required height of flood water above the open spillway is reduced. Such method that is increasing spillway weir crest may be applied for Sermo Dam.
The paper studie a typical reservoir called Waduk Sermo that is located in Kulon Progo, Special province of Jogjakarta, where the data is available for simulation. During three years of record, Sermo resevoir spills quite a lot of water which otherwise was very useful for the domestic water. With the increasing need for clean water, it is essential to study the real availability of water in the reservoir. Such spill would have been minimized when the dam was equipped with siphon spillway. Mathematical modeling of water balance in the reservoir during the three years of record was carried out. The out flow includes water for irrigation, electricity power and domestic purpose (drinking water). The domestic water discharge is varied in order to obtain optimal capacity for water withdrawal. The effect of higher spillway crest on the capacity of the reservoir to supply domestic water is simulated for comparison.
The study shows that Sermo reservoir is capable of serving approximately 1501/s of domestic water with time of service is 92%. This is the same as if no water is available for approximately one month per year. An additional dam crest of 1 m high produces a capacity of approximately 2251/s at the same risk as before. There is approximately an additional 2 million m3 of water available for domestic water yearly. It is concluded that such reservoir might have been more optimal when the crest was 1 m higher.