

DESIGN OF A CHECK DAM FOR SEDIMENT CONTROL IN PACET DISTRICT, MOJOKERTO REGENCY

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ABSTRACT

Pacet District, Mojokerto Regency, is a highland area that is prone to natural disasters such as flash floods and debris flows due to high rainfall and steep topography. To overcome the problem of sedimentation and potential disasters, a technical study is needed in the form of a check dam control plan. This study aims to analyze the planned flood discharge, the effect of flooding on sediment transport, and plan the dimensions and stability of the check dam structure in the Kromong River. The methodology used includes hydrological analysis using rainfall data with the Gumbel method to determine the planned discharge obtained 817.29 mm with a coefficient of 0.7, in the Nakayasu synthetic unit hydrograph calculation method produced 1649.67 m³/sec in a 50-year return period, the sedimentation calculation method uses the Takahashi method to obtain 1680.034 m³/sec and the planning of the check dam dimensions. Structural stability against overturning forces, sliding forces and earthquakes. The calculation results show that the planned check dam is able to withstand peak flood discharge with a 50-year return period and has stable dimensions. This research contributes to disaster mitigation and sediment control efforts in areas prone to landslides and floods and can be used as a reference for the construction of check dams in these areas.

Keywords: Check dam, planned flood discharge, sedimentation, building stability, Kromong River, Pacet.

PERENCANAAN CHECK DAM SEBAGAI PENGENDALI SEDIMEN KEC. PACET KAB. MOJOKERTO

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ABSTRAK

Kecamatan Pacet, Kabupaten Mojokerto, merupakan dataran tinggi yang rentan terhadap bencana alam seperti banjir bandang dan aliran debris akibat curah hujan tinggi dan kondisi topografi yang curam. Untuk mengatasi permasalahan sedimentasi dan potensi bencana tersebut, diperlukan perencanaan pengendali berupa check dam. Penelitian ini bertujuan untuk menganalisis debit banjir rencana, pengaruh banjir terhadap angkutan sedimen, dan merencanakan dimensi serta stabilitas bangunan check dam di kali kromong. Metodologi yang digunakan meliputi analisis hidrologi menggunakan data curah hujan dengan metode gumbel untuk menentukan debit rencana, analisis sedimentasi menggunakan rumus takahashi, serta perencanaan dimensi check dam. Stabilitas setruktur terhadap gaya guling, gaya geser dan gempa. Hasil perhitungan menunjukkan bahwa check dam yang direncanakan mampu menahan debit puncak banjir dengan periode ulang 50 tahun dan memiliki dimensi yang setabil. Penelitian ini memberikan konstribusi dalam upaya mitigasi bencana dan pengendalian sedimen didaerah rawan longsor dan banjir serta dapat dijadikan referensi untuk pembangunan check dam di wilayah tersebut.

Kata Kunci : Check dam, debit banjir rencana, sedimentasi, stabilitas bangunan, kali kromong, Pacet.