

ANALISIS STABILITAS DINDING PENAHAN TANAH MODEL KANTILEVER PADA BENDUNG KLORAHAN DI KABUPATEN JEMBER

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ABSTRAK

Dinding penahan tanah tipe kantilever berdasarkan kondisi tanah, geometri struktur, dan beban yang bekerja. Data penelitian diperoleh melalui survei lapangan, pengujian tanah, data gambar rencana, serta data curah hujan tahun 2014–2023. Analisis hidrologi dilakukan menggunakan metode Hidrograf Satuan Sintetik (HSS) Nakayasu, sedangkan kecepatan aliran dihitung dengan Persamaan Manning. Hasil analisis menunjukkan kecepatan aliran sebesar 0,33 m/s dengan Bilangan Froude 0,03 yang termasuk aliran subkritis. Kecepatan aliran kritis sebesar 3,84 m/s, sehingga potensi gerusan akibat kecepatan aliran tergolong rendah. Analisis stabilitas menunjukkan faktor keamanan terhadap geser sebesar 2,41 dan guling sebesar 4,10. Daya dukung tanah diperoleh sebesar 674,97 kPa dengan daya dukung izin 224,99 kPa. Hasil tersebut menunjukkan dinding penahan tanah dalam kondisi stabil dan memenuhi persyaratan keamanan.

Kata Kunci: Bendung Klorahan, Dinding Penahan Tanah, Hidrologi, Stabilitas, Tipe Kantilever.

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ABSTRAK

The earth-retaining wall at the Klorahan Weir serves to maintain the stability of the slope against soil pressure and river flow conditions. This study aims to analyze the stability of a cantilever-type earth-retaining wall based on soil conditions, structural geometry, and applied loads. Research data were obtained through field surveys, soil testing, design drawings, and rainfall data from 2014–2023. Hydrological analysis was performed using the Nakayasu Synthetic Unit Hydrograph (SHU) method, while flow velocity was calculated using Manning's Equation. The analysis results show a flow velocity of 0.33 m/s with a Froude number of 0.03, which falls within the subcritical flow range. The critical flow velocity is 3.84 m/s; therefore, the potential for scouring due to flow velocity is classified as low. The stability analysis indicates a safety factor against shear of 2.41 and against overturning of 4.10. The soil bearing capacity was determined to be 674.97 kPa, with an allowable bearing capacity of 224.99 kPa. These results indicate that the earth retaining wall is in a stable condition and meets the safety requirements.

Kata Kunci: Klorahan Dam, Earth Retaining Wall, Hydrology, Stability, Cantilever Type.