

# EVALUASI DAN REKAYASA LERENG BEKAS TAMBANG PASIR DI DESA TALUN, KECAMATAN KEMALANG, KABUPATEN KLATEN

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## INTISARI

Desa Talun merupakan sebuah desa di Kecamatan Kemalang, Kabupaten Klaten yang berjarak 12 km dari puncak Gunung Merapi menyebabkan Desa Talun memiliki cadangan material vulkanik. Masyarakat memanfaatkan kondisi ini sebagai lapangan pekerjaan dengan membuka tambang pasir. Namun dalam prosesnya, tidak terlihat ada perencanaan sehingga terjadi kasus gerakan massa tanah di area bekas tambang. Hal ini diperburuk dengan rumah dan aktivitas masyarakat yang dekat dengan lereng bekas tambang. Untuk itu, penelitian dengan tujuan (1) Mengetahui kondisi eksisting lereng bekas tambang pasir berdasarkan parameter geometri, sifat fisik tanah dan sifat mekanik tanah. (2) Mengevaluasi tingkat kestabilan lereng bekas tambang pasir berdasarkan nilai faktor keamanan di daerah penelitian. (3) Menentukan arahan pengelolaan yang direkomendasikan dengan memperhatikan nilai faktor keamanan di daerah penelitian.

Metode dalam penelitian menggunakan metode kuantitatif dan kualitatif. Pengumpulan data penelitian dilaksanakan dengan survei dan pemetaan serta uji laboratorium. Proses pengambilan sampel dilakukan dengan *purposive sampling* dengan *undisturbed sampling* berdasar pada spesifikasi ASTM D-1587 untuk uji sudut geser, kohesi berat isi serta kadar air. Pada pengujian porositas dan ukuran butir dilaksanakan dengan *disturbed sampling*. Pengujian infiltrasi tanah dilakukan menggunakan *double ring method* yang mengacu pada SNI 7752:2012. Metode analisis kestabilan lereng menggunakan metode Janbu yang disederhanakan serta analisis deskriptif menurut Kepmen No. 1827 K/30/2018 dan Klasifikasi Faktor Keamanan Bowles, 1989.

Berdasarkan survei, ketiga lereng memiliki perbedaan kondisi: lereng utara dengan sudut kemiringan  $83^\circ$  dan tinggi 12,2 m, lereng timur dengan kemiringan  $87^\circ$  dan tinggi 15,3 m, serta lereng selatan dengan kemiringan  $76^\circ$  dan tinggi 12,9 m. Analisis faktor keamanan lereng utara dengan faktor keamanan 1,236 termasuk lereng kritis, 1,340 lereng timur termasuk lereng stabil dan 0,958 pada lereng selatan yang termasuk lereng tidak stabil. Arahan pengelolaan yang dilakukan adalah dengan melakukan rekayasa geometri. Menghasilkan FK stabil di lereng utara menjadi 1,895; Lereng timur menjadi 2,545; Lereng selatan menjadi 1,629. Arahan pendukung untuk rekayasa lereng geometri adalah penanaman vegetasi rumput vetiver.

**Kata kunci:** Kestabilan Lereng, Faktor Keamanan, Janbu yang disederhanakan

**EVALUATION AND ENGINEERING OF SAND MINING SLOPES IN TALUN VILLAGE, KEMALANG SUB-DISTRICT, KLATEN DISTRICT**

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**ABSTRACT**

*Talun Village is a village in Kemalang Sub-district, Klaten Regency, which is 12 km from the peak of Mount Merapi, causing Talun Village to have volcanic material reserves. The community utilized this condition as a job opportunity by opening a sand mine. However, in the process, there was no planning, resulting in a case of land mass movement in the former mining area. This was exacerbated by the houses and activities of the community being close to the slopes of the former mine. Therefore, research with the aim of (1) Identifying the existing condition of the sand mine slope based on the parameters of geometry, soil physical properties and soil mechanical properties. (2) Evaluate the level of stability of the former sand mine slope based on the value of the safety factor in the research area. (3) Determine the recommended management direction by considering the value of safety factor in the study area.*

*The research method used quantitative and qualitative methods. Data collection was carried out by surveying and mapping as well as laboratory tests. The sampling process was carried out by purposive sampling with undisturbed sampling based on ASTM D-1587 specifications for shear angle, cohesion, weight and moisture content tests. The porosity and grain size tests were carried out with disturbed sampling. Soil infiltration testing was conducted using double ring method which refers to SNI 7752:2012. The slope stability analysis method uses simplified Janbu and descriptive analysis according to Kepmen No. 1827 K/30/2018 and Bowles Safety Factor Classification, 1989.*

*Based on the survey, the three slopes exhibit different conditions: the northern slope with an inclination angle of 83° and a height of 12.2 m, the eastern slope with an inclination angle of 87° and a height of 15.3 m, and the southern slope with an inclination angle of 76° and a height of 12.9 m. The safety factor analysis shows that the northern slope, with a safety factor of 1.236, is classified as a critical slope, the eastern slope, with a safety factor of 1.340, is considered stable, and the southern slope, with a safety factor of 0.958, is classified as unstable. The recommended management approach involves geometric engineering, which results in a stable safety factor for the northern slope of 1.895, for the eastern slope of 2.545, and for the southern slope of 1.629. A supporting recommendation for slope geometry engineering is the planting of vetiver grass vegetation.*

**Keyword: Slope Stability, Safety Factor, Janbu simplified**