ABSTRAK

STUDI KOMPARATIF PENGARUH JENIS, SPASI VERTIKAL, DAN PANJANG GEOSINTETIK TERHADAP STABILITAS DAN DEFORMASI MSE *WALL* (*STUDI KASUS: PROYEK FLYOVER DI KAWASAN INDUSTRI JABABEKA IX*)

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Proyek *flyover* Kawasan Industri Jababeka IX membutuhkan struktur penahan tanah pada oprit timbunan. MSE *Wall* dengan perkuatan geosintetik dipilih sebagai solusi. Penelitian ini menganalisis stabilitas eksternal, internal, dan lereng, serta deformasi MSE *Wall* menggunakan metode numerik PLAXIS 2D. Dua belas variasi dimodelkan dengan mengkombinasikan dua jenis geogrid (Hibritex LP105 dan LP155), dua spasi vertikal (0,4 m dan 0,6 m), dan tiga panjang (7, 8, dan 8,5 m). Analisis stabilitas eksternal menunjukkan SF geser = 1,408, eksentrisitas e = 1,053 m < e_{max} = 2,125 m, dan kapasitas dukung q_R = 436,436 kN/m² > σ_v = 224,481 kN/m²—seluruhnya terpenuhi pada kondisi statis maupun gempa ($k_h = 0{,}202g$). Stabilitas internal seluruh 25 lapisan geogrid aman terhadap putus dan cabut. Seluruh 12 variasi menghasilkan SF statis 1,824–3,121 (≥1,5) dan SF gempa 1,218–1,503 (≥1,1). Deformasi vertikal berkisar 17,67–22,21 mm dan lateral 6,08–8,11 mm, keduanya jauh di bawah batas SNI 8460:2017. Variasi 9 (LP155, 8,5 m, spasi 0,4 m) direkomendasikan sebagai konfigurasi paling optimal.

Kata kunci: MSE *Wall*, Geogrid, PLAXIS 2D, Stabilitas Lereng, Deformasi, Geosintetik

ABSTRACT

COMPARATIVE STUDY OF THE INFLUENCE OF GEOSYNTHETIC TYPE, VERTICAL SPACING, AND LENGTH ON THE STABILITY AND DEFORMATION OF MSE WALLS (CASE STUDY: FLYOVER PROJECT IN THE JABABEKA IX INDUSTRIAL AREA)

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The Jababeka IX Industrial Estate flyover project requires a retaining structure for its embankment. A Mechanically Stabilized Earth (MSE) Wall reinforced with geosynthetics was selected. This study analyzes external and internal stability, slope stability, and deformation of the MSE Wall using PLAXIS 2D numerical method. Twelve variations were modeled by combining two geogrid types (Hibritex LP105 and LP155), two vertical spacings (0.4 m and 0.6 m), and three lengths (7, 8, and 8.5 m). External stability analysis shows SF sliding = 1.408, eccentricity $e = 1.053$ m $< e_{max} = 2.125$ m, and bearing capacity $q_R = 436.436$ kN/m² $> \sigma_v = 224.481$ kN/m²—all satisfied for both static and seismic ($k_h = 0.202g$) conditions. Internal stability of all 25 geogrid layers is safe against rupture and pullout. All 12 variations produce static SF of 1.824–3.121 (≥1.5) and seismic SF of 1.218–1.503 (≥1.1). Vertical deformation ranges 17.67–22.21 mm and lateral deformation 6.08–8.11 mm, both well below SNI 8460:2017 limits. Variation 9 (LP155, 8.5 m, 0.4 m spacing) is recommended as the optimal configuration.

Keywords: MSE Wall, Geogrid, PLAXIS 2D, Slope Stability, Deformation, Geosynthetic