

SARI

Terowongan saat ini mulai dijadikan alternatif untuk rekayasa konstruksi yang dapat dimanfaatkan demi keperluan lalu lintas, dimana konstruksi terowongan harus didasari oleh pemilihan metode penggalian yang sesuai dan dapat beradaptasi dengan kondisi batuan maupun tanah itu sendiri. Penelitian dilakukan untuk menentukan karakteristik geologi teknik permukaan dan bawah permukaan melalui pemetaan geologi teknik serta menentukan metode penggalian yang sesuai pada konstruksi terowongan sisi kiri jalan tol Cisumdawu Jawa Barat. Karakteristik geologi teknik didasari oleh aspek batuan dan tanah, serta struktur geologi. Hasil penelitian menunjukkan bahwa pada daerah penelitian tersusun atas dua satuan batuan yaitu satuan breksi vulkanik dan satuan breksi laharik yang sudah mengalami pelapukan dengan tingkat sangat tinggi sehingga menghasilkan tanah dengan jenis dan karakteristik yang berbeda-beda. Breksi vulkanik permukaan menghasilkan tiga jenis tanah diantaranya *sandy silt*, *sandy elastic silt* dan *clayey sand*. Breksi laharik menghasilkan dua jenis tanah yaitu *sandy silt* dan *sandy elastic* dengan nilai plastisitas berkisar antara 4,60 - 38,39%. Breksi vulkanik bawah permukaan hasil *facemap* bukaan terowongan menghasilkan dua jenis tanah yaitu *sandy silt* dan *sandy elastic silt* dengan nilai plastisitas berkisar antara 5,73 - 25,16%. Kedua nilai tersebut termasuk dalam tingkatan plastisitas rendah sampai tinggi. Struktur geologi yang berkembang di daerah penelitian yaitu sesar turun diperkirakan, namun struktur tersebut tidak mempengaruhi konstruksi terowongan, dibuktikan dari pengamatan lapangan dan hasil analisis data seismik refraksi di sepanjang jalur terowongan oleh Laboratorium Geofisika ITB, 2007. Hasil evaluasi metode penggalian terowongan mengacu pada *Japan Society of Civil Engineers (JSCE)* (2007), menghasilkan metode penggalian terowongan yang sesuai di daerah penelitian yaitu metode *bench cut* dengan *multiple bench cut*.

Kata kunci: Terowongan Cisumdawu, karakteristik geologi teknik, metode penggalian.

ABSTRACT

Today, tunnels are starting to become an alternative for construction engineering that could be utilized for traffic needs, in which tunnel construction has to be based on corresponding excavation method researches and a method that could adapt in rock or soil condition itself. The research was conducted to determine characteristics of engineering geology at surface and underground through engineering geological mapping and deciding which excavation method that is appropriate or suitable for the tunnel construction on the left side of the road of a highway in Cisumdawu, West Java. The characteristics of engineering geology are based on rocks, soil, and also structural geology aspects. The research result shows that on the research area, it consists of two rock units, which are the volcanic breccia unit and laharic breccia unit that has been through very high weathering process that is resulting in soils with different types and characteristics. The volcanic breccia's surface result in three types of soils, which are sandy silt, sandy elastic silt and clayey sand. The laharic breccia result in two types of soil, which are sandy silt and sandy elastic with 4,60 - 38,39% of plasticity value. In the underground of the volcanic breccia from the tunnel's opening facemap, result in two soil types, which are sandy silt and sandy elastic silt with 5,73 - 25,16% of plasticity value. Both numbers are included in the range of low to high plasticity. The structural geology that is developing in the research area which the estimated normal fault, though the structure does not influence the tunnel construction, proven from the project observation by Laboratorium Geofisika ITB, 2007. The result of tunnel excavation method evaluation refers to Japan Society of Civil Engineers (JSCE) (2007), resulting in tunnel excavation method that is appropriate for the research area and that is the bench cut method with multiple bench cut.

Keywords: *Cisumdawu Tunnel, characteristics of engineering geology, excavation methods*