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**Analisis Perbandingan Metode Open Cut dan Sheet Pile pada Penggantian Saluran Outfall di Bawah Jalan
Lintas Sumatera**
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INTISARI

Pekerjaan penggantian saluran *outfall* pada area *crossing* Jalan Lintas Sumatera memiliki tantangan teknis karena berada di bawah badan jalan nasional dan memerlukan galian sedalam 6,34 m pada segmen sepanjang 9,50 m. Saluran eksisting berupa *corrugated steel pipe* (CSP) lama direncanakan diganti dengan *box culvert* baru. Perancangan ini bertujuan membandingkan metode *open cut* dan *sheet pile* berdasarkan kestabilan geoteknik, kuantitas pekerjaan, dan durasi pelaksanaan.

Analisis kestabilan kedua metode dilakukan menggunakan GEO5 dengan metode Morgenstern-Price. Kuantitas pekerjaan dihitung berdasarkan geometri masing-masing metode, sedangkan durasi pelaksanaan dihitung berdasarkan kuantitas pekerjaan, produktivitas alat, jumlah alat, dan urutan pekerjaan.

Hasil analisis menunjukkan kedua metode memenuhi kriteria kestabilan geoteknik. Metode *open cut* terpilih dengan kemiringan lereng 3:2 menghasilkan faktor keamanan 1,32 (kriteria minimum 1,3), sedangkan *sheet pile* menghasilkan faktor keamanan struktur 2,15 menggunakan tipe ESC-CRZ52-700 dengan kedalaman minimum 6,86 m. Dari aspek kuantitas, *open cut* menghasilkan pekerjaan berbasis volume 4.762,63 m^3, luas 613,04 m^2, dan unit sebanyak 11 unit, sedangkan *sheet pile* menghasilkan volume 2.725,02 m^3, luas 256,32 m^2, panjang 784 m (pemancangan 392 m dan pencabutan 392 m), dan unit 11 unit. Dari aspek durasi, *open cut* membutuhkan 7,25 hari sedangkan *sheet pile* membutuhkan 16,89 hari. Dengan demikian, metode *open cut* dipilih sebagai metode yang lebih sesuai karena memenuhi kriteria kestabilan, berdurasi lebih singkat, dan memenuhi target maksimum 14 hari, sedangkan *sheet pile* tidak memenuhi target tersebut.

Kata kunci: *open cut*, *sheet pile*, *corrugated steel pipe*, stabilitas lereng galian, durasi pelaksanaan

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ABSTRACT

The replacement of the outfall channel at the crossing area of Jalan Lintas Sumatera presents technical challenges due to its location beneath a national road, requiring a 6.34 m deep excavation along a 9.50 m work segment. The existing corrugated steel pipe (CSP) channel is planned to be replaced with a new box culvert. This study aims to compare the open cut and sheet pile methods based on geotechnical stability, work quantity, and construction duration.

The stability analysis of both methods was conducted using GEO5 with the Morgenstern-Price method. Work quantities were calculated based on the geometry of each method, while construction duration was estimated from work quantities, equipment productivity, number of equipment units, and work sequence.

The results show that both methods satisfy the geotechnical stability criteria. The selected open cut method, with a 3:2 slope inclination, produced a factor of safety of 1.32 (minimum criterion of 1.3), while the sheet pile method produced a system factor of safety of 2.15 using ESC-CRZ52-700 sheet piles with a minimum embedment depth of 6.86 m. In terms of work quantity, the open cut method resulted in 4,762.63 m^3 of volume-based work, 613.04 m^2 of area-based work, and 11 units, while the sheet pile method resulted in 2,725.02 m^3 of volume, 256.32 m^2 of area, 784 m of length (392 m of driving and 392 m of extraction), and 11 units. In terms of duration, the open cut method required 7.25 days, while the sheet pile method required 16.89 days. Therefore, the open cut method was selected as the more suitable method, satisfying the stability criteria, requiring a shorter duration, and meeting the 14-day maximum target, while the sheet pile method did not meet this target.

Keywords: open cut, sheet pile, corrugated steel pipe, slope stability, construction duration