ABSTRAK

ANALISIS DEVIASI HASIL PERHITUNGAN VOLUME *CUT AND FILL* MENGGUNAKAN METODE PENAMPANG RATA-RATA DAN METODE BERBASIS GRID DARI DEM
(Studi Kasus: Kegiatan Perencanaan Lokasi Sumur Pengeboran Migas pada PT. Pertamina Hulu Rokan Area Sumatra Selatan)

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Perhitungan volume *cut and fill* merupakan salah satu tahapan penting dalam pekerjaan tanah karena berpengaruh terhadap kebutuhan material dan perencanaan teknis konstruksi. Oleh karena itu, penelitian ini dilakukan pada lokasi perencanaan pengeboran sumur PT. Pertamina Hulu Rokan untuk menganalisis hasil perhitungan volume *cut and fill* menggunakan variasi interval penampang serta metode berbasis grid dari DEM.

Metode yang digunakan dalam penelitian ini yaitu metode penampang rata-rata dengan interval penampang 1 m, 5 m, dan 10 m serta metode berbasis grid dari DEM. Data yang digunakan berupa data topografi hasil pengukuran Lidar dengan elevasi rencana yang sama pada kedua metode. Analisis dilakukan dengan menghitung volume *cut and fill*, nilai deviasi, serta pengujian statistik menggunakan *paired sample t-test* .

Hasil deviasi menunjukkan nilai terkecil pada interval 1 m sebesar 2,23%, diikuti interval 5 m sebesar 2,40% dan interval 10 m sebesar 3,24%. Hasil uji t menunjukkan bahwa interval penampang 1 m tidak berbeda signifikan terhadap metode DEM pada volume *fill* (t hitung = 0,756; t tabel = 1,656) dan volume *cut* (t hitung = 0,346; t tabel = 1,656). Sementara itu, interval 5 m menunjukkan perbedaan signifikan pada volume *fill* (t hitung = 2,023; t tabel = 1,703) dan volume *cut* (t hitung = 3,539; t tabel = 1,703), sedangkan interval 10 m menunjukkan perbedaan signifikan pada volume *cut* (t hitung = 3,479; t tabel = 1,761) tetapi tidak pada volume *fill* (t hitung = 1,536; t tabel = 1,761). Hal ini menunjukkan bahwa interval penampang 1 m menghasilkan estimasi volume yang paling mendekati metode DEM.

Kata Kunci: *cut and fill*, DEM, deviasi, penampang rata-rata.

ABSTRACT

DEVIATION ANALYSIS OF CUT AND FILL VOLUME CALCULATION RESULTS USING THE AVERAGE END AREA METHOD AND GRID-BASED DEM METHOD (Case Study: Planning Activities for Oil and Gas Drilling Well Sites at PT. Pertamina Hulu Rokan, South Sumatra Area)

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The calculation of cut and fill volume is an important stage in earthwork activities because it affects material requirements and construction technical planning. Therefore, this study was conducted at the drilling well planning site of PT. Pertamina Hulu Rokan to analyze the results of cut and fill volume calculations using variations of cross-section intervals and a grid-based DEM method. The method used in this study is the average end area method with cross-section intervals of 1 m, 5 m, and 10 m, as well as a grid-based DEM method. The data used consist of LiDAR-derived topographic data with the same design elevation for both methods. The analysis was carried out by calculating cut and fill volumes, deviation values, and statistical testing using a paired sample t-test. The deviation analysis showed that the smallest deviation was obtained at the 1 m cross-section interval, with a value of 2.23%, followed by the 5 m interval at 2.40% and the 10 m interval at 3.24%. The deviation analysis showed that the smallest deviation was obtained at the 1 m cross-section interval, with a value of 2.23%, followed by the 5 m interval at 2.40% and the 10 m interval at 3.24%. The t-test results indicated that the 1 m interval did not show a significant difference from the DEM method for either fill volume (t-value = 0.756; t-table = 1.656) or cut volume (t-value = 0.346; t-table = 1.656). In contrast, the 5 m interval showed significant differences for both fill volume (t-value = 2.023; t-table = 1.703) and cut volume (t-value = 3.539; t-table = 1.703), while the 10 m interval showed a significant difference for cut volume (t-value = 3.479; t-table = 1.761) but not for fill volume (t-value = 1.536; t-table = 1.761). These results indicate that the 1 m cross-section interval produced volume estimates that were closest to those obtained using the DEM method.

Keywords: *cut and fill, DEM, deviation, average end area method.*