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**Analisis Tingkat Akurasi Quantity Takeoff Volume Beton dan Tulangan Berdasarkan Level of Development (LOD 350 dan LOD 400) Pada Model BIM Terhadap Realisasi Pekerjaan Struktur (Studi Kasus: Eka Hospital Puri)**
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# INTISARI

Building Information Modelling (BIM) memungkinkan proses *quantity takeoff* dilakukan secara terstruktur melalui model tiga dimensi. Tingkat pengembangan model atau *Level of Development* (LOD) dapat memengaruhi informasi yang digunakan dalam perhitungan kuantitas. Penelitian ini bertujuan untuk mengetahui hasil *quantity takeoff* volume beton dan berat tulangan pada model BIM LOD 350 dan LOD 400, menghitung deviasinya terhadap realisasi pekerjaan, serta menganalisis kemungkinan penyebab deviasi.

Penelitian ini dilakukan pada pekerjaan struktur beton bertulang yang meliputi kolom, balok, dan pelat lantai 1 sampai lantai 6 pada Proyek Pembangunan Eka Hospital Puri, Kembangan. Model LOD 350 dikembangkan berdasarkan dokumen *Detail Engineering Design* (DED), sedangkan model LOD 400 dikembangkan berdasarkan dokumen *Shop Drawing* menggunakan perangkat lunak Autodesk Revit *Student Version*. Data pembanding berupa realisasi beton dan besi tulangan terpasang yang diperoleh dari laporan pelaksanaan proyek serta dokumen pendukung.

Hasil *quantity takeoff* menunjukkan bahwa model LOD 350 menghasilkan volume beton sebesar 6,366.441 m³ dan berat tulangan sebesar 1,141,901.199 kg, sedangkan model LOD 400 menghasilkan volume beton sebesar 6,375.856 m³ dan berat tulangan sebesar 1,160,629.550 kg. volume beton realisasi sebesar 6,672.500 m³ dan berat tulangan realisasi sebesar 1,191,791.945 kg. Berdasarkan perbandingan tersebut, model LOD 350 memiliki deviasi sebesar -306.059 m³ atau -4.587% untuk beton dan -49,890.746 kg atau -4.186% untuk tulangan. Model LOD 400 memiliki deviasi sebesar -296.644 m³ atau -4.446% untuk beton dan -31,162.395 kg atau -2.615% untuk tulangan. Berdasarkan hasil deviasi tersebut, nilai deviasi negatif menunjukkan bahwa hasil *quantity takeoff* pada kedua model lebih kecil dibandingkan dengan kuantitas yang terealisasi di lapangan. Analisis menunjukkan bahwa deviasi dapat dipengaruhi oleh interpretasi dalam pemodelan, perbedaan informasi antara DED dan *Shop Drawing*, serta kondisi pelaksanaan pekerjaan di lapangan.

**Kata kunci:** *Building Information Modelling (BIM)*, *Level of Development, Quantity Takeoff, deviasi, beton, tulangan.*

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# *ABSTRACT*

*Building Information Modeling (BIM) enables quantity takeoff to be performed systematically through three-dimensional models. The Level of Development (LOD) of a model can influence the information used in quantity calculations. This study aims to determine the concrete volume and reinforcement weight obtained from BIM LOD 350 and LOD 400 models, calculate their deviations from actual work quantities, and analyze the factors associated with these deviations.*

*This study examines reinforced concrete structural works consisting of columns, beams, and slabs from Floors 1 to 6 of the Eka Hospital Puri Construction Project in Kembangan. The LOD 350 model was developed based on the Detail Engineering Design (DED) documents, while the LOD 400 model was developed based on the Shop Drawing documents using Autodesk Revit Student Version. The comparison data consisted of actual concrete quantities and installed reinforcement quantities obtained from project execution reports and supporting documents.*

*The quantity takeoff results show that the LOD 350 model yielded a concrete volume of 6,366.441 m³ and a reinforcement weight of 1,141,901.199 kg, while the LOD 400 model yielded a concrete volume of 6,375.856 m³ and a reinforcement weight of 1,160,629.550 kg. The actual concrete volume was 6,672.500 m³, and the actual reinforcement weight was 1,191,791.945 kg. Based on this comparison, the LOD 350 model showed deviations of −306.059 m³ (−4.587%) for concrete and −49,890.746 kg (−4.186%) for reinforcement. The LOD 400 model showed deviations of −296.644 m³ (−4.446%) for concrete and −31,162.395 kg (−2.615%) for reinforcement. The negative deviation values indicate that the quantity takeoff results from both models were lower than the quantities realized in the field. The analysis identified differences in slab information between the DED and Shop Drawing documents, including the change from a planned void to a slab and adjustments to the wet-area layout, as well as formwork failure during slab casting on Floor 6. These findings describe the factors associated with the observed quantity discrepancies; the contribution of each factor to the total deviation was not quantified.*

***Keywords:*** *Building Information Modelling (BIM), Level of Development, Quantity Takeoff, deviation, concrete, reinforcement.*