

ABSTRAK

Zahra Putriana Susatio: *Perbandingan Quantity Take Off Material Menggunakan BIM Revit Dengan Microsoft Excel Pada Perencanaan Struktur Atas Jembatan Beton Prategang PC-I Girder (Studi Kasus: Proyek Jembatan Alue Reuling, Provinsi Aceh)*. Skripsi, Fakultas Teknik, Universitas Negeri Medan, 2025

Jembatan memiliki peran penting dalam mendukung mobilitas dan pertumbuhan ekonomi dengan menghubungkan dua wilayah yang terpisah oleh hambatan alami maupun buatan. Oleh karena itu, perencanaan jembatan perlu memperhatikan akurasi dan efisiensi konstruksi, salah satunya dalam perencanaan *Quantity Take Off* (QTO) untuk memperkirakan volume material secara tepat dan efisien. Di Indonesia, metode QTO konvensional masih dominan, biasanya menggunakan Microsoft Excel yang mengacu pada gambar kerja dua dimensi (2D), meskipun metode ini memiliki keterbatasan dari sisi akurasi dan efisiensi. Sebagai alternatif, *Building Information Modelling* (BIM) menawarkan pendekatan berbasis model tiga dimensi (3D) yang memungkinkan proses QTO dilakukan secara lebih akurat, efisien, dan menyeluruh. Penelitian ini bertujuan membandingkan hasil QTO pekerjaan beton dan tulangan pada struktur atas jembatan beton prategang PC-I girder Jembatan Alue Reuling di Provinsi Aceh, menggunakan metode BIM dan metode konvensional. Struktur atas jembatan dipilih karena memiliki bentuk geometri yang spesifik dan memerlukan detail perhitungan lebih teliti. Perhitungan menggunakan metode BIM dilakukan dengan perangkat lunak Revit, sementara metode konvensional menggunakan Microsoft Excel dengan acuan gambar kerja 2D. Hasil penelitian menunjukkan volume pekerjaan beton metode BIM sebesar 59,8780 m³ dan konvensional sebesar 59,8796 m³, dengan selisih 0,0027%. Sedangkan volume pekerjaan tulangan menunjukkan hasil BIM sebesar 10.715,700 kg dan konvensional 10.763,6749 kg, dengan selisih 0,4476%. Selisih ini menunjukkan bahwa BIM memiliki tingkat akurasi lebih tinggi dalam memodelkan detail tulangan seperti *bending* dan *overlap*.

Kata kunci: Jembatan, *Quantity Take Off* (QTO), *Building Information Modelling* (BIM), Konvensional, Revit

ABSTRACT

Zahra Putriana Susatio: Comparison of Material Quantity Take Off using BIM Revit with Microsoft Excel in the Design of Prestressed Concrete PC-I Girder Bridge Superstructures (Case Study: Alue Reuling Bridge Project, Aceh Province). Thesis, Faculty of Engineering, Medan State University, 2025

Bridges play a pivotal role in facilitating mobility and fostering economic development by connecting areas separated by natural or artificial barriers. Consequently, bridge planning must emphasize both accuracy and efficiency in construction processes, particularly in the preparation of Quantity Take Offs (QTO) for the accurate and efficient estimation of material volumes. In Indonesia, conventional QTO methods remain predominant, typically involving the use of Microsoft Excel based on two-dimensional (2D) working drawings. However, these methods present limitations in terms of precision and operational efficiency. As an alternative, Building Information Modeling (BIM) offers a three-dimensional (3D), model-based approach that enhances the QTO process by enabling more accurate, efficient, and comprehensive estimations. This study aims to compare the results of QTO calculations for concrete and reinforcement works on the superstructure of the PC-I prestressed concrete girder bridge at the Alue Reuling Bridge in Aceh Province, utilizing both the BIM-based and conventional methods. The superstructure was selected due to its complex geometric configuration, which necessitates detailed computational analysis. The BIM-based QTO was conducted using Autodesk Revit, while the conventional method employed Microsoft Excel in conjunction with 2D working drawings. The result of this study indicate that the concrete work volume calculated using the BIM method is 59.8780 m^3 , while the conventional method results in 59.8796 m^3 , with a difference of 0.0027%. For reinforcement work, BIM produces a total volume of 10,715.7100 kg, compared to 10,763.6749 kg obtained through the conventional method, resulting in a difference of 0.4476%. These results suggest that BIM offers a higher degree of accuracy in modeling reinforcement details, particularly in aspects such as bending and overlap.

Keywords: Bridge, Quantity Take Off (QTO), Building Information Modeling (BIM), Conventional, Revit