

ANALISIS PERBANDINGAN VOLUME ANTARA METODE KONVENSIONAL DAN *BUILDING INFORMATION MODELLING* PADA PEKERJAAN JEMBATAN VOIDED

Nama : 1. Azzam Azis Burhanudin (232098)

2. Bagus Dwi Purnomo (232099)

Pembimbing : 1. Bhima Dhanardono, S.T., M.Eng.

2. Maulida Amalia Rizki, S.T., M.Eng.

ABSTRAK

Perhitungan volume beton sangat berpengaruh terhadap efisiensi biaya dan pengendalian pelaksanaan proyek konstruksi. Penelitian ini bertujuan membandingkan perhitungan volume beton metode konvensional dan *Building Information Modelling* (BIM) pada pekerjaan Jembatan *Voided* pada Proyek Jalan Tol Solo–Yogyakarta–NYIA Kulon Progo Seksi II Paket 2.2B, mengidentifikasi faktor-faktor perbedaan hasil, serta analisis kelebihan dan kekurangan metode BIM. Metode kuantitatif komparatif digunakan dengan membandingkan perhitungan *Microsoft Excel* berdasarkan *shop drawing* dan pemodelan 3D *Autodesk Revit* menggunakan *Material Take Off*. Objek penelitian mencakup delapan elemen struktur: *pile cap*, *abutment*, *wing wall*, plat injak, *bearing pad*, *girder*, *slab*, dan *parapet*. Hasil penelitian menunjukkan total volume beton metode konvensional sebesar 1.410,43 m³ dan metode BIM sebesar 1.410,42 m³. Selisih yang sangat kecil (0,01 m³) terjadi akibat perbedaan pembulatan desimal pada perangkat lunak, bukan karena perbedaan dimensi struktur. Faktor yang memengaruhi ketelitian konvensional meliputi pembacaan gambar dan penggunaan rumus, sedangkan BIM dipengaruhi kualitas pemodelan dan ketepatan material. BIM memberikan kelebihan berupa efisiensi waktu, otomatisasi pembaruan volume saat perubahan desain, serta meminimalkan *human error*. Namun, BIM membutuhkan waktu pemodelan awal, kompetensi khusus pengguna, serta lisensi perangkat lunak dan spesifikasi *hardware* yang memadai.

Kata kunci: Jembatan *Voided*, Volume Beton, Metode Konvensional, *Building Information Modelling* (BIM), *Autodesk Revit*.

ABSTRACT

Accurate concrete volume calculation affects cost efficiency and project execution control. This study aims to compare concrete volume calculations between conventional and Building Information Modelling (BIM) methods for the Voided Bridge work on the Solo–Yogyakarta–NYIA Kulon Progo Toll Road Project, Section II Package 2.2B, while identifying factors causing differences and analyzing BIM's pros and cons. A comparative quantitative method was used, comparing Microsoft Excel calculations based on shop drawings with Autodesk Revit 3D modeling using Material Take Off. Eight structural elements were analyzed: pile cap, abutment, wing wall, approach slab, bearing pad, girder, slab, and parapet. The results showed a total concrete volume of 1,410.43 m³ for the conventional method and 1,410.42 m³ for the BIM method. The minor difference (0.01 m³) resulted from software decimal rounding mechanisms rather than dimensional discrepancies. Conventional accuracy depends on drawing interpretation and formula application, whereas BIM relies on modeling quality and material input precision. BIM offers advantages in time efficiency, automatic volume updates during design changes, and reduced human error. However, it requires initial modeling time, specialized user skills, software licenses, and adequate hardware specifications.

Keywords: *Voided Bridge, Concrete Volume, Conventional Method, Building Information Modelling (BIM), Autodesk Revit.*