

REDESIGN GEDUNG PERKULIAHAN DENGAN MENGGUNAKAN BUILDING INFORMATION MODELING 3D, 4D DAN 5D (Studi Kasus: Gedung Kullah C Universitas 'Aisyiyah Yogyakarta)

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ABSTRAK

Industri perkembangan konstruksi saat ini berkembang pesat, dari yang sebelumnya pembuatan dokumen rencana terpisah-pisah serta banyak terjadinya kesalahan. Sehingga hal ini didukung oleh pemerintah untuk melakukannya agar standar dokumen rencana seperti gambar kerja, penjadwalan, rancangan biaya yang sebelumnya terpisah menjadi terintegrasi dalam bentuk digital modern. Penggunaan *Building Information Modeling* (BIM) didukung oleh *software* Autodesk Revit dan Naviswork memiliki fitur *auto calculation* melakukan perhitungan volume berdasarkan model 3D. BIM terhubung pada penjadwalan 4D serta biaya konstruksi 5D mengacu pada 3D model. *Output* yang dihasilkan dari *quantity take off* material ataupun elemen dari masing-masing pekerjaan struktur dan arsitektur yang dibandingkan serta menghitung selisihnya dengan volume proyek. *Output* dikembangkan menggunakan *software* Autodesk Naviswork berbentuk simulasi penjadwalan 4D serta pemodelan cost estimation 5D yang diintegrasikan pada *software* Revit dan Naviswork. Hasil didapatkan, terjadinya miskomunikasi pada gambar DED struktur yakni balok 20%, plat lantai 26%, dan tangga 46%. Pekerjaan arsitektur pada beton praktis sebesar 100%. Selisih antara volume proyek dengan volume Revit sebesar Fondasi 9,12 %, sloof 11%, kolom 3%, balok 35%, shearwall 2%, plat lantai 7%, tangga 26%, Pas. Dinding 30%. Pemodelan 4D dilakukan *clash detection*, *clash* yang terjadi ialah: *pile cap* dan fondasi talud batu kali pada grid A-2 dan F-2, sloof (struktur) dan ramp (arsitektur) grid B-2 dan E-2. Balok dan dinding yang bertabrakan. Simulasi penjadwalan BIM 4D pada Naviswork berdasarkan penjadwalan Ms. Project yakni 31 minggu struktur dan 60 minggu arsitektur. Simulasi menemukan masalah terhadap kolom K5 grid (B-1, C-1, D-1, E-1). Pemodelan 5D *Cost estimation* mendapatkan kesimpulan sebagai berikut: Pekerjaan struktur Rp 18.019.472.781,40, meliputi pekerjaan fondasi, kolom, sloof dan balok, plat lantai dan shearwall. Pekerjaan arsitektur Rp 15.591.711.113, meliputi pekerjaan dinding, partisi, plafon, pintu dan jendela, dan fasad dengan selisih 18,14% pada pekerjaan struktur dan 74,34% pada pekerjaan arsitektur.

Kata kunci: BIM 3D, 4D, 5D, Integrasi, Autodesk Revit, Autodesk Naviswork

REDESIGN OF LECTURE BUILDING USING BUILDING INFORMATION MODELING 3D, 4D AND 5D

(Case Study: Lecture C Building at 'Aisyiyah University, Yogyakarta)

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ABSTRACT

The construction development industry is currently growing rapidly, from the previous preparation of separate planning documents and the occurrence of many errors to what it is today. So that this is supported by the government to carry out its development so that standard planning documents such as working drawings, scheduling, cost plans which were previously separate become integrated in a modern digital form. The use of Building Information Modeling (BIM) supported by Autodesk Revit and Naviswork software has an auto calculation feature that performs volume calculations based on 3D models. BIM is connected to 4D scheduling and 5D construction costs refer to 3D models. The output resulting from the quantity take off of materials or elements from each structural and architectural work is compared and calculates the difference with the project volume. The output was developed using Autodesk Naviswork software in the form of 4D scheduling simulations and 5D cost estimation modeling integrated into Revit and Naviswork software. The results obtained, the occurrence of miscommunication in the DED images of the structure, namely beams 20%, floor plates 26%, and stairs 46%. 100% practical architectural work on concrete. The difference between project volume and Revit volume is 9.12% foundation, 11% sloof, 3% column, 35% beam, 2% shearwall, 7% floor slab, 26% staircase, Pas. Wall 30%. 4D modeling was carried out clash detection, the clashes that occurred were: pile caps and river stone talud foundations on grids A-2 and F-2, sloof (structure) and ramp (architecture) grids B-2 and E-2. Colliding beams and walls. BIM 4D scheduling simulation on Naviswork based on Ms. The project is 31 weeks of structure and 60 weeks of architecture. The simulation found a problem with the K5 grid columns (B-1, C-1, D-1, E-1). 5D Cost estimation modeling draws the following conclusions: Structural work Rp. 18,019,472,781.40, including work on foundations, columns, sloofs and beams, floor plates and shearwall. Architectural work Rp. 15,591,711,113, including walls, partitions, ceilings, doors and windows, and facades with a difference of 18.14% for structural work and 74.34% for architectural work.

Keywords: BIM 3D, 4D, 5D, Integration, Autodesk Revit, Autodesk Naviswork