

ABSTRAK

Mengurangi VO pada model kontrak Design and Build, diperlukan peningkatan koordinasi, komunikasi, dan manajemen perubahan antara tim desain, pelaksana proyek, dan penyedia layanan. Penelitian ini bertujuan menganalisis pengaruh BIM 4D dan BIM 5D terhadap *Variation Order* pada model kontrak Desain and Building, serta pengaruh kombinasinya. Penelitian ini menguji efektivitas penerapan metode BIM 4D dan 5D untuk mitigasi perubahan pekerjaan dalam proyek. Data dikumpulkan melalui kuesioner dan dianalisis dengan SPSS untuk Windows. Hasil penelitian menunjukkan Variabel BIM 4D berpengaruh signifikan terhadap penggunaan *Variation Order* untuk mengurangi perubahan pasca konstruksi. Koefisien $X1$ BIM 4D (β_1) 0,937 menunjukkan bahwa peningkatan $X1$ BIM 4D sebesar 1 meningkatkan $Y1$ *Variation Order* sebesar 0,937. Analisis regresi menunjukkan t-hitung 4,343 yang signifikan pada tingkat 0,05 ($p < 0,05$). Variabel BIM 5D berpengaruh signifikan terhadap *Variation Order* dalam mengurangi perubahan-pertumbuhan setelah konstruksi. Nilai koefisien β_2 $X2$ BIM 5D adalah 0,120 dan positif, yang berarti setiap peningkatan 1 kali $X2$ BIM 5D akan meningkatkan $Y1$ Kinerja Keuangan sebesar 0,120. Hasil analisis regresi $Y1 = 17,920 + 0,937 X1 + 0,120 X2$ menunjukkan nilai t-hitung 3,764 dan signifikansi 0,048. Hasil pengolahan data menunjukkan nilai F-hitung 83,893 dan signifikansi 0,000. H_0 dan H_a diterima. BIM 4D dan BIM 5D berpengaruh signifikan terhadap *Variation Order* sebagai alat untuk meminimalkan perubahan-pertumbuhan pasca konstruksi. Penerapan teknologi BIM 4D dan 5D membantu mitigasi risiko proyek konstruksi melalui simulasi langkah-langkah proyek, pelatihan tim proyek, visualisasi perubahan/permintaan menggunakan BIM, dan penyimpanan informasi spesifikasi material dalam model BIM. Teknologi BIM mengurangi risiko dan meningkatkan efektivitas proyek konstruksi.

Kata Kunci: *BIM 4D dan 5D, Variation Order, Design and Build.*

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ABSTRACT

Reducing VO in the Design and Build contract model requires increased coordination, communication, and change management between the design team, project implementers, and service providers. This study aims to analyze the effect of BIM 4D and BIM 5D on the Order of Variations in the Design and Building contract model, as well as the effect of their combinations. This study examines the effectiveness of applying the 4D and 5D BIM methods to mitigate work changes in projects. Data was collected through questionnaires and analyzed with SPSS for Windows. The results showed that the BIM 4D variable had a significant effect on the use of Variation Order to reduce post-construction changes. The X1 BIM 4D coefficient (β_1) is 0.937 indicating that an increase in X1 BIM 4D by 1 increases the Y1 Variation Order by 0.937. Regression analysis showed a tcount of 4.343 which is significant at the 0.05 level ($p < 0.05$). The 5D BIM variable has a significant effect on Variation Order in reducing post-construction-growth changes. The coefficient value of β_2 X2 BIM 5D is 0.120 and is positive, which means that every 1-time increase in X2 BIM 5D will increase Y1 Financial Performance by 0.120. The results of the regression analysis showed a tcount value of 3.764 and a significance of 0.041. The results of data processing show a Fcount value of 83.893 and a significance of 0.000. H_0 and H_a are accepted. BIM 4D and BIM 5D have a significant effect on Variation Order as a tool for minimizing post-construction growth changes. The application of 4D and 5D BIM technologies helps mitigate construction project risks through simulating project steps, training project teams, visualizing changes/requests using BIM, and storing material specification information in BIM models. BIM technology reduces risks and increases the effectiveness of construction projects..

Keywords: BIM 4D and 5D, Variation Orders, Design and Build.

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