

Dedication

This thesis is dedicated to my father, who taught me that the best kind of knowledge to have is that which is learned for its own sake. It is also dedicated to my mother, who taught me that even the largest task can be accomplished if it is done one step at a time.

A special feeling of gratitude to my loving sisters and brothers, whose believe in the richness of learning and word of words of encouragement. They also have supported me unlimitedly all the way since the beginning of my studies.

To my wife and children, I say, I appreciate the patience and support. There were times when you needed me, whom you missed for he was so engrossed in this academic journey whose destination we now celebrate.

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Thank you.

Abstract

The fourth dimension model is a good tool that allows better visibility of the construction work during the planning stage, better communication among project team and more efficient planning. Additionally, 4D modeling supports planners in achieving detailed and accurate work plans, planning of temporary structure, quantity takeoffs and managing site logistics.

The aim of the current study is to assess the potential impact of adapting 4D modeling in the (AEC) industry in Sudan, the objectives have been achieved through a questionnaire and applying 4D model through a case study of a simple tall building contents 11 floors by using Navisworks software. The results obtained, interpreted and discussed thoroughly.

The output that were directed to respondents concluded that the 4D model provides the basis for a common language between all parties and a representation of the project schedule and component of construction model, Navisworks software considered as a very good software to use in AEC industry in Sudan, because it belongs to Autodesk group therefore easiness to importing\exporting from other Autodesk software like Autocad, Revit and others.

The results of this study recommended that there is an essential need for raise of awareness among engineers whose work in AEC industry in Sudan by role of BIM-4D technology in enhancing projects management.

The recommendations of this research are useful for the policy makers to establish legislations towards the welfare of the AEC industry in Sudan.

The study concluded 4D modeling as a promising tool for construction planning.

المستخلص

تعتبر تقنية نموذج البعد الرابع اداة جيدة تتيح الرؤية الافضل لأعمال التشييد خلال مرحلة التخطيط، ; كما تتيح التواصل الافضل بين فرق المشروع وزيادة كفاءة التخطيط. بالاضافة الى ذلك تدعم نماذج البعد الرابع فريق التخطيط في تحقيق خطط عمل مفصلة ودقيقة، تخطيط البنية المؤقتة للمشاريع الكبيرة، حصر الكميات وادارة الخدمات اللوجستية للموقع.

تهدف الدراسة الى تقييم الاثر المحتمل من تطبيق تقنية نموذج البعد الرابع في صناعة التشييد بالسودان. وقد تم تحقيق اهداف البحث باستخدام نموذج استبيان وايضا عن طريق تطبيق عملي لتقنية نموذج البعد الرابع لمبنى مكون من 11 طابق باستخدام برنامج نافزوويركس. وتم الوصول الى النتائج ومن ثم تفسيرها ومناقشتها بدقة.

وخلصت النتائج المتحصلة من المستجيبين الى اعتبار ان نموذج البعد الرابع يوفر الاساس للغة مشتركة بين جميع الاطراف بالمشروع بالاضافة لامكانية تمثيل الجدول الزمني للمشروع وعرض مكونات ومراحل المخرج النهائي من المشروع. ويمكن اعتبار برنامج نافزوويركس من البرامج المميزة لتطبيق هذه التقنية في صناعة التشييد بالسودان وذلك لانتمائه لمجموعة اتوديسك وبالتالي سهولة الربط بالاستيراد او التصدير للنماذج فيما بينه وبين برامج اتوديسك الاخرى مثل اتوكاد وريفت وغيرها.

اوصت نتائج هذه الدراسة على ان هنالك حاجة أساسية لرفع مستوى الوعي بين المهندسين العاملين في صناعة التشييد في السودان عن اهمية ودور تقنية نموذج البعد الرابع في تحسين ادارة المشروعات.

تعد توصيات هذا البحث مفيدة لصانعي السياسات لوضع تشريعات تهدف الى تطوير وتحسين كفاءة الاداء للمشاريع في صناعة التشييد في السودان.

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