

BUILDING INFORMATION MODELING IN CONSTRUCTION INDUSTRY-A REVIEW.

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Abstract-*Building information modeling is a digital representation of physical and functional characteristics of a building. Nowadays BIM is used widely in large Construction because of their unique feature. The small scale construction industry also started to use BIM tools. they give complete details of a structure and it helps to document The complete life cycle of a structure. this paper gives the knowledge about BIM usage in Construction industry.*

Keywords: BIM,digital,document, construction.

1. INTRODUCTION: For every construction project there is a need for managing the project for a better understanding of all construction process, and it cannot be managed easily, there is a need of IT applications in construction field. By this, the project can be handled properly by higher authority to the lower level staffs. In this way Building information modeling is used. It is a 3D modelling of a structure. Through BIM each element of a structure can be viewed clearly.BIM has unique features That it integrates project delivery system, it has unique language to enhance the informative communication between various construction software application. it perform clash detection, analysis the building, time&estimation through 4D&5D approach, quantity take off which helps in decision making for project managers and teams.

1.2. BIM at various aspects :BIM involves in various construction management process like cost management, project management, facility operation

of a building. it helps to envisage virtual construction of a facility to its actual physical construction. by these it reduces uncertainties ,improves safety, simulates and analyse potential impacts. information related to project can be updated periodically and can be viewed at any time.

2. REVIEW ON BUILDING INFORMATION MODELLING:

Hande aladag(2016): studies that due to globalization changes, there is a lot of improvement in technologies which rises a competition in the construction industry. by taking this into consideration he analysed the usage of BIM in Turkish construction industry and he found that obstacle on using BIM by various reasons like organisational structure and culture of companies ,high initial investment over implementation of BIM software and hardware ,technological deficiencies of stakeholder etc., and he concluded that by overcoming these obstacles BIM gives more advantageous environment like efficient monitoring and reporting, efficient project management during project life cycle, improved scheduling capabilities and reduces changes during construction.

Saeed rokooei (2015):studies that BIM becomes collaborative process in construction industry and their growth is huge in last decade. This happens because of their incredible features. The author tries

to show the role of BIM and project manager in construction project. The BIM performs clash detection, constructability, analysis of structure, 4D and 5D (time and cost estimation), communication in construction project. The project manager should understand BIM for managing the project and for decision making. The author suggested adding BIM knowledge in curricula of project management professionals for better construction practices.

Ramesh kannan (2013): studies the usage of BIM in vertical development structures formwork system. The author compared the conventional formwork system with climbing formwork system in a 20 storey high rise building using BIM. By developing the model using BIM the author explored the details like cost, time, quality, safety and other factors in conventional and climbing formwork. And he concluded that more complex formwork models can also be generated using BIM and their constructability and build ability factors can be known. Other than formwork, scaffoldings, shoring can also be incorporated in BIM for better results.

Zbigniew kacprzyk (2014): studies usage of BIM along with scheduling time known as 4D BIM. The author developed a stairwell reconstruction using 4D BIM. The stairwell drawing from CAD 2D is generated as 3D BIM and used along scheduling time. By this they document the process easily. Using BIM they manage the project easily at each phase. Thus the author suggested to choose the BIM software because it simplifies the task and savings and creates good economical project.

Pawel nowak (2016): studies the usage of BIM in decision making optimization in construction project. The author chooses practical example for choice of best location of the office building. He gathered the facilities involved in building using BIM and different locations were suggested by the planner. BIM performs the energy consumption of building at different

locations and they are iterated through reference point method for decision making. The decision maker conducted six iterations and chooses the second iteration solution as the best one. The building is located in New Delhi, India. Thus the author concluded that along with BIM some other project management decision making software are used. So it can also be included in BIM in future.

Laila M. khodeir (2016): studies BIM usage for heritage building retrofitting work. They made sustainable retrofitting in Egyptian heritage buildings for conservation to maintain the value embedded in them. They analysed for different heritage buildings by sustainable retrofit and HBIM. Although heritage buildings are analysed using BIM, there is a lack of equipment, professional and finance in the country which makes the heritage buildings as is it. At last the author concluded that there is a need of investment for applying BIM and sustainable retrofit in Egypt to get a better return investment.

Mojtabavalejadshoubi (2015): studies BIM usage for reducing environmental impacts and to know energy usage in real time in residential buildings. For constructing a sustainable building they assigned different combinations of material to design buildings using BIM to find out the most successful combination of material for a good sustainable building and their energy consumption. By using BIM it helps architects and building designers to develop energy efficient buildings in future and maintain the life cycle of buildings.

abdulkadir ganah (2015): studies BIM usage for health and safety in onsite construction. Through BIM 4D CAD models can be generated by designers' need. In that they show tower crane movements and other construction vehicle movements which makes the construction more reliable. By this occupational safety can be increased during construction phase and they can be documented for future use. The author concluded that BIM gives a visual

environment of a site. so health and safety can also be included as package property within BIM to make safe construction site.

Lino maia(2015):studies BIM usage for modelling on laundry building in Portugal. the author implemented 2D CAD design drawings into BIM .it gives 3D model of a building, automated budgeting ,quantities and cost of a the building. the author concludes that demand of BIM will increase day by day because of the parameter they possess throughout the life cycle of a structure.

Maggie khaddaj (2016): studies BIM usage in retrofitting on existing buildings and their sustainability. the author also examines whether BIM offers platform for reducing energy consumption in existing building. by the proper data management and interoperability are serious informational challenges and to adapt legal and organisation framework to standardise BIM for existing building and can be utilised for renovation projects.

Droyoung ahn(2014):studies BIM usage in a real time project to provide guidance for project managers in step by step approach in BIM for maintain information in earlier stage of project.the author carried out BIM With facility management for planning and management of project. so the work efficiency gets increased due to correct information provided in BIM model. Atlast the author shows saving in time and money by using BIM with facility management.

Maria joao falco silva (2016):studies BIM usage in road map proposal in Portugal.BIM gives the digital representation of physical and functional characteristics of places to make a proposal of road map .from this BIM can be spread into Portugal country .atlast they formed the road map which becomes a great achievement and the author initiates to make BIM an mandatory adoption in Portuguese construction industry for public work process.

Z.Zahrizan(2013):studies BIM usage in Malaysian construction industry. the author studies some literature review and interviewed construction industries about their BIM usage and experiences .but most of the organisations are unaware about BIM.the author suggested the government should take necessary steps to implement BIM in construction industry and to create awareness about the BIM applications which manages a structure throughout its lifecycle.also the construction organisation should mandate BIM packages in their field to improve productivity in construction .

Emad elbeltagi (2014): studies BIM usage for cost estimation and monitoring of a building .the BIM gives visual characteristics of a building and their facilities involved in the building. the quantities are extracted and exported from BIM model data base .then using Microsoft project cost estimation can be made. Then the cost are monitored after the estimation through MSP and they can be updated periodically .the actual cost and estimated cost difference can be calculated. By this visualised cost estimate and control model .the author says it helps to manage the project in well manner.

David bryde(2012):studies BIM usage for benefits in project.the author collected secondary data from 35 construction projects done by BIM system. the author received both positive and negative review about BIM. the positive review are BIM reduces cost and control project throughout the project life cycle.the negative reviews are more training and awareness are needed for BIM usage .the author concluded that BIM should be marketed widely and their initial costs should be reduced for using BIM in smaller firms too.

Stephen fai(2014):studies BIM usage for heritage buildings documentation. The author undergoes a case study at Batawa company in Canada which is a

popular shoe company. by using BIM they are renovated without changing much. After the renovation all types of data are documented for future use. The author concluded that by using BIM it helps in heritage building documentation, conservation and dissemination. The data are also available in the web.

G. Carbonari (2015): studies BIM usage for two existing buildings for better understanding of BIM system in UK. The model of two buildings are generated. They made retroBIM framework model for facility management in two existing buildings. The model developed during design and construction phase are different from the model generated in retrofitting stage in BIM. But it gives complete architectural details which helps facility manager for managing building and to improve the validity of building through BIM.

CONCLUSION: From the above review it shows that BIM is not only made for 3D modelling of building and they can be used in various ways. It possesses features like

1) manage the project, 2) decision making, 3) documentation of project, 4) retrofitting of structure, 5) health and safety management, 6) analysis of the environmental impact on the structure.

BIM possesses a more positive approach to the construction industry for customer satisfaction, time reduction, cost reduction, good organisation work in future, BIM usage will be more in construction industry and the professionals should show much interest on implementing BIM system approach.

REFERENCE:

- [1]Hande Aladaga , Gökhan Demirdögen And Zeynep Isik, "building information modeling (BIM) use in turkish construction industry",world multidisciplinary civil engineering-architecture-urban planning symposium 2016,wmcaus 2016*procedia engineering 161 (2016) 174 – 179.*
- [2]Saeed Rokooei,"Building Information Modeling In Project Management: Necessities, Challenges And Outcomes", 4th international conference on leadership, technology, innovation and business management, *procedia - social and behavioral sciences 210 (2015) 87 – 95.*
- [3]Nor Diana Aziz, Abdul Hadi Nawawi, Nor Rima Muhamad Ariff, Asean-Turkey Asli (Annual Serial Landmark international) conferences on quality of life 2016,*procedia - social and behavioral sciences 234 (2016) 353 – 362.*
- [4] Ramesh Kannan.M, , Helen Santhi.M, "Constructability Assessment Of Climbing Formwork Systems Using Building Information Modeling," International Conference On Design And Manufacturing, Icondm 2013, *Procedia Engineering 64 (2013) 1129 – 1138.*
- [5] Zbigniew Kacprzyk And Tomasz K, "Building Information Modelling – 4d Modelling Technology On The Example Of The Reconstruction Stairwell", Xxiii R-S-P Seminar, Theoretical Foundation Of Civil Engineering (23rsp) (Tfoce 2014), *Procedia Engineering 91 (2014) 226 – 231.*
- [6] PawelNowak, Mariola Ksi, Marcin Drap And Jacek Zawistowski," Decision Making With Use Of Building Information Modeling", Xxv Polish – Russian – Slovak Seminar "Theoretical Foundation Of Civil Engineering", *Procedia Engineering 153 (2016) 519 – 526.*
- [7] Laila M. Khodeir , Daliaaly And Shaimaatarek , " Integrating Hbim (Heritage Building Information Modeling) Tools In The Application Of Sustainable Retrofitting Of Heritage Buildings In Egypt", *Improving Sustainability Concept In Developing Countries, Procedia Environmental Sciences 34 (2016) 258 – 270.*
- [8] Mojtaba Valinejad Shoubi, Masoud Valinejad Shoubi , Ashutosh Bagchi And Azin Shakiba Barough," Reducing The Operational Energy Demand In Buildings Using Building Information Modeling Tools And Sustainability Approaches", *Ain Shams Engineering Journal (2015) 6, 41-55.*
- [9] Abdulkadir GanahAnd Godfaurd A. John," Integrating Building Information Modeling And Health And Safety For Onsite Construction",*Safety And Health At Work 6 (2015) 39e45.*
- [10] Lino Maia, Pedro Mêda And João G. Freitas," BIM Methodology, A New Approach - Case Study Of Structural Elements Creation", 1st International Conference On Structural Integrity, *Procedia Engineering 114 (2015) 816 – 823.*
- [11] Maggie Khaddaj And Issam Srour," Using Bim To Retrofit Existing Buildings", International Conference On Sustainable Design, Engineering And Construction, International Conference On Sustainable Design, Engineering And Construction.
- [12] Dooyong Ahn And Heesung Cha,"Integration Of Building Maintenance Data In Application Of Building Information Modeling (BIM)", *Journal Of Building Construction And Planning Research, 2014, 2, 166-172.*
- [13] Maria João Falcão Silva, Filipa Salvado, Paula Couto And Álvaro Vale E Azevedo,"Roadmap Proposal For Implementing Building Information Modelling (BIM) In Portugal", *Open Journal Of Civil Engineering, 2016, 6, 475-481.*

[14] Z. Zahrizan, Nasly Mohamed Ali, Ahmad Tarmizi Haron, Amanda Marshall-Ponting And Zuhairi Abd Hamid," Exploring The Adoption Of Building Information Modelling (BIM) In The Malaysian Construction Industry: A Qualitative Approach",International Journal Of Research In Engineering And Technology Eissn: 2319-1163 | Pissn: 2321-7308.

[15] Emad Elbeltagi, Ossama Hosny, Mahmoud Dawood And Ahmed Elhakeem," Bim-Based Cost Estimation/ Monitoring For Building Construction", *Emad Elbeltagi Int. Journal Of Engineering Research And Applications* Www.Ijera.Com Issn : 2248-9622, Vol. 4, Issue 7(Version 4), July 2014, Pp.56-66.

[16] David Bryde , Martí Broquetas And Jürgen Marc Volm," The Project Benefits Of Building Information Modelling (BIM)",International Journal Of Project Management 31 (2013) 971-980.

[17] Stephen Fai, Katie Graham, Todd Duckworth, Nevil Wood And Ramtin Attar," Building Information Modelling And Heritage Documentation", Autodesk Research.

[18] G. Carbonari, S. Stravoravdis And C. Gausden," Building Information Model Implementation For Existing Buildings For Facilities Management: A Framework And Two Case Studies", Building Information Modelling (BIM) In Design, Construction And Operations 395.