

Integration of Building Information Modeling Framework for 4D Constructability Review and Clash Detection Management of a Sewage Treatment Plant

Authors : Malla Vijayeta, Y. Vijaya Kumar, N. Ramakrishna Raju, K. Satyanarayana

Abstract : Global AEC (architecture, engineering, and construction) industry has been coined as one of the most resistive domains in embracing technology. Although this digital era has been inundated with software tools like CAD, STADD, CANDY, Microsoft Project, Primavera etc. the key stakeholders have been working in siloes and processes remain fragmented. Unlike the yesteryears' simpler project delivery methods, the current projects are of fast-track, complex, risky, multidisciplinary, stakeholder's influential, statutorily regulative etc. pose extensive bottlenecks in preventing timely completion of projects. At this juncture, a paradigm shift surfaced in construction industry, and Building Information Modeling, aka BIM, has been a panacea to bolster the multidisciplinary teams' cooperative and collaborative work leading to productive, sustainable and leaner project outcome. Building information modeling has been integrative, stakeholder engaging and centralized approach in providing a common platform of communication. A common misconception that BIM can be used for building/high rise projects in Indian Construction Industry, while this paper discusses of the implementation of BIM processes/methodologies in water and waste water industry. It elucidates about BIM 4D planning and constructability reviews of a Sewage Treatment Plant in India. Conventional construction planning and logistics management involves a blend of experience coupled with imagination. Even though the excerpts or judgments or lessons learnt gained from veterans might be predictive and helpful, but the uncertainty factor persists. This paper shall delve about the case study of real time implementation of BIM 4D planning protocols for one of the Sewage Treatment Plant of Dravyavati River Rejuvenation Project in India and develops a Time Liner to identify logistics planning and clash detection. With this BIM processes, we shall find that there will be significant reduction of duplication of tasks and reworks. Also another benefit achieved will be better visualization and workarounds during conception stage and enables for early involvement of the stakeholders in the Project Life cycle of Sewage Treatment Plant construction. Moreover, we have also taken an opinion poll of the benefits accrued utilizing BIM processes versus traditional paper based communication like 2D and 3D CAD tools. Thus this paper concludes with BIM framework for Sewage Treatment Plant construction which will achieve optimal construction co-ordination advantages like 4D construction sequencing, interference checking, clash detection checking and resolutions by primary engagement of all key stakeholders thereby identifying potential risks and subsequent creation of risk response strategies. However, certain hiccups like hesitancy in adoption of BIM technology by naïve users and availability of proficient BIM trainers in India poses a phenomenal impediment. Hence the nurture of BIM processes from conception, construction and till commissioning, operation and maintenance along with deconstruction of a project's life cycle is highly essential for Indian Construction Industry in this digital era.

Keywords : integrated BIM workflow, 4D planning with BIM, building information modeling, clash detection and visualization, constructability reviews, project life cycle

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