THE VALUE OF USING BIM TECHNOLOGIES FOR IMPLEMENTATION ENGINEERING SMART CITIES

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Problem statement. As the world becomes increasingly interconnected and technology-dependent, a new wave of smart applications is changing how we approach everyday activities. There is an increasing belief that newly-available technologies and changes in working practices could now bring about real change. This belief has been brought up in particular by the adoption of Building Information Modelling (BIM). BIM technology is very important nowadays for the constructions, designing, and manipulating any related aspects to the project management. BIM is used to deliver more sustainable buildings, more quickly and more efficiently, as well as the promotion of more collaborative working practices, and improvements in off-site manufacturing [1; 3].

Purpose of the study. The basic idea of applying BIM to smart cities is to have an interactive, smart city model, similar to the method of developing information models for building and other related projects which contain graphical and no graphical data in a common data environment. These information models are utilized to design, operate and manage buildings and infrastructure projects productively with minimum wastage and adverse effects towards the environment, whilst aiming for sustainability. Smart cities should include integrated solutions with all the engineering careers from the first step of introducing the idea through the planning, designing, and implementation in the reality. A building remains integrated continuously with other bases like the transportation system, utilities, etc. Hence it is a challenging task to accomplish, but that's the excellence of BIM. Projects that implement BIM open up the opportunities for collaboration and a free flow of standardized information across systems [2].

Maine results. It is important to discuss quality control forms and the used technology for predicting invisible faults (inside the walls), and this is for all engineering utilities (power, control, communication, construction, etc.). Edge Devices must be designed using low cost and higher efficiency. Wi-Fi enabled micro-controllers which can be controlled by the Control System should be used. If the used devices aren't smart devices, they should be made part of the network using basic relays and a programmable Wi-Fi enabled micro-controllers. Furthermore, the edge device may include sensors. Then the sensors reading values are read from it can be transferred to the Primary Module either for the collection of data or to trigger an action by the same edge device or another device in the network. Also pointing out the process control conditions and control devices and software should recognize what is the most suitable system for implementation: is it Distributed Control System (DCS), or Supervisory Control And Data Acquisition (SCADA), or Direct Digital Control (DDC), or Building Management Systems (BMS). All of these are controlling systems and could be used in the smart cities not only industrial. Many forms of infrastructure, including the electricity grid, water supply, and waste water rely on SCADA systems that are used to control functions and flow. These systems measure how an infrastructure is performing in real-time and enable either automated or human operator interventions to take the correct actions when needed. Moreover, Infrastructure lacking instrumentation, automation and control could result in an odd system. Existing automation and control systems may be geographically distributed and require significant travel time for operators to manually access them. Examples may include water

wells, treatment plants, municipal buildings, traffic control cabinets, and power sub-station equipment. Investments in these areas can become outdated quickly. As a result, a trend is emerging to outsource the data reporting infrastructure to service providers. If these controlling systems are used to know the direct place of any kind of leakage (gas, liquid, or solid) which could not be observed by eyes (because the pipes are inside the wall or under the ground). Thus, checking this diversion or leakage by the monitoring and measurement systems (like SCADA) will appear on the control panel or Human Machine Interface (HMI) immediately pointing to the place and will be determined automatically by the monitoring sensors. Therefore, that will reduces time to find the place and cause of the problem or the leakage. Otherwise, this will cause and provide waste water and environmental pollution.

Therefore, by using control systems and monitoring could predict the problem before it happens, based on monitoring the occurrence of cracks and faults in sensors. The benefits of working on such sensitive control systems will provide job opportunities in all fields, not only power engineers and environmental engineers but it needs control engineers and construction engineers and all engineering disciplines. However, this concept should be considered in BIM [4].

Conclusion. The proper controlling and monitoring environment would provide an automation level which would require less tenant's interaction with maintenance and operation call center which means less complaints. The momentum of smart cities strategies could also be exploited more to make better use of BIM; this might be done through emphasizing the potential of city information modeling and the opportunity it offers to link different data sets from BIM modeled construction sites in order to facilitate wider city development. BIM and 3D modeling are a boon for Smart Cities. The 3D software allows constructors to level model infrastructure to build underground. While making a city, the workers know how deep to dig it to not break into a fiber optic cable or a gas pipeline. Drainage, highway and bridge architects can work with the similarly immersive model. Since all this is geo-referenced, an exact geographic design is a reward. Digital innovation and BIM technology can transform the process of design, construction, and management of smart buildings and smart cities.

References

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