

The Importance of Software in Sustainable Construction

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Abstract

Sustainability is a complex topic in the construction industry, but it's an ever more prevalent one as people realize the harmful impact construction has on the environment. From excessive fuel consumption to wasted resources to costly human errors, the problems are apparent. Luckily, emerging technologies and software programs are finding and addressing opportunities to improve energy efficiency and make construction a more sustainable and green industry.

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Background to the Study

Building Information Modeling

Building Information Modeling (BIM) is a software tool that enables architects, engineers and contractors to create digital models of buildings and infrastructure projects. BIM can contribute to sustainable construction by promoting energy efficiency, reducing waste, conducting lifecycle assessments, identifying sustainable materials, designing water-efficient systems and improving collaboration among stakeholders. By leveraging the capabilities of BIM software in construction, firms can help reduce the environmental impact of buildings and promote a more sustainable built environment.

3D Printing

3D printing and fabrication can reduce waste while also making buildings more sustainable. It gives construction companies the power to fabricate items on-site, meaning they don't have to wait for delivery if they find they're short on material. Improving efficiency means fewer resources are used during the project. 3D printed materials are often more lightweight and pliable, so less fuel is used to move materials and construct the building. We are not far off from constructing houses and buildings exclusively using 3D-printed materials. This technology can also lead to better uses for recycled materials and renewable resources that will reduce the environmental impact of a construction project.

Energy Analysis

Construction companies can use energy analysis software programs to determine how efficient a building will be before they even break ground. These programs can make suggestions for improving the efficiency of a design, like smart lighting, strategic window placement or different building materials. Architects and engineers can look into the environmental and energy performance of buildings through software and adjust their projects until they reach the most energy-efficient design possible. This software has already helped people create a net zero energy status for facilities, which is a triumph in the mission of sustainability. The energy analysis program considers a variety of factors that contribute to the energy consumption of a building, including environmental, technological, economic and social factors.

AR and VR

Augmented Reality (AR) and **Virtual Reality (VR)** are one of the biggest emerging technologies in construction. In case you are unfamiliar with these technologies, here is a quick definition.

1. An augmented or enhanced digital version of an existing space. It uses computer-generated input to alter a physical reality on a digital platform.
2. VR. A completely new digital environment generated in place of the existing environment, creating a 100 percent digital and artificial setting.

AR and VR can help engineers, managers and architects better plan construction projects and account for flaws before construction begins. These programs will make it easier to catch logistical problems before they happen. But AR and VR take it a step further. People working

on the project can step into this digital environment to see what the building will be like when completed. VR allows people to explore buildings that don't exist yet, while AR helps people understand how renovations will look and function and how a space can be altered. Not only do these digital realities help people understand the look and feel of a potential building, but it also allows them to find opportunities to increase energy efficiency that they can build into the construction plans. Once construction is underway, making these kinds of changes is difficult, expensive, and sometimes impossible.

Linear Scheduling Programs

Most people who live in or near urban areas have likely experienced one of those never-ending construction projects. Sometimes it feels like it takes years to repave a road or decades to erect a building. While many constructions require substantial time to complete, a lot of efficiencies are lost due to scheduling problems and unmet deadlines. Linear scheduling programs help companies meet their projected deadline, which is rare in the construction industry. On-time equipment and material deliveries mean fewer resources used during the construction process. Essentially, it streamlines the scheduling process for a massive project, ensuring no time or resources go to waste waiting around for workers or deliveries.

On-Site Waste Reduction

This technology is revolutionary. Software programs can track fuel consumption, materials, inventory, energy consumption and more. They can assess a site's operations and pinpoint where resources can be used better to lower energy consumption. Things like faulty equipment, unnecessary idling or inefficient equipment routes can all increase energy consumption without anyone realizing it, but this software can make recommendations to improve these processes. The best part is that every time the software points out an opportunity to improve efficiency, managers, engineers, architects and workers will learn from it, inherently becoming more sustainably conscientious.

Automation

Nowadays, every industry is utilizing automation, and construction is no exception. Making once manual tasks automated improves efficiency, so the project can get done faster and use fewer resources. Simple operations like payroll and timesheets can be 100 percent automated, so workers and managers can focus on more complex matters that require human intervention. The possibilities of automation in the construction industry are thrilling, as they can reduce human error, labor costs and the duration of projects.

Paperless Practices

Last but not least, construction companies are looking for every opportunity to reduce paper waste. From paper blueprints to physical paychecks to inventory sheets, paper waste is a massive problem in the construction industry. Digitizing everything, from timesheets to design models, substantially reduces paper waste and also enhances organization and efficiency. Everyone working on the project can have instant access to all the important paperwork on a tablet or phone, easing communication and information sharing.

The Future of Construction

Construction is a massive industry always looking to improve, and right now, the future of construction looks very green. Not only are companies happy to improve efficiency and lower costs, but the government is also working toward laws that will make the use of sustainable materials and green practices mandatory. These innovative technologies are the catalyst for more sustainable construction.

Reference

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