

New Ideas in Civil Engineering

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Perspective

Construction innovation is critical to make building construction more efficient and long-lasting. New Civil Engineering innovation emerges on a regular basis to improve the efficiency, quality, and long-term viability of a construction project. Civil engineering technology is impacting the construction sector in ways it has never been influenced before. Cloud-based cooperation and artificial intelligence-based robots, super-materials, wearable technology, and pollution-eating structures are all helping to the construction industry's efficiency. So, here are some of the most cutting-edge civil engineering technologies and innovative ideas to keep an eye on in 2021 and beyond.

Self-healing concrete

Cement is the most frequently used building material, but it is also one of the most significant sources to damaging carbon emissions, accounting for roughly 7% of annual global emissions. Cracking in construction is a big issue, which is mainly caused by contact to water and chemicals. Researchers at Bath University are working on a self-healing concrete mix that contains bacteria in microcapsules that will germinate when water enters a break in the concrete, forming limestone and closing the fissure before water and oxygen can corrode the steel reinforcement.

Thermal convergence

In the building sector, the necessity for efficient insulation material is becoming increasingly significant. Heat passes directly through the building exterior, whether it's masonry, block, or stud frame, to the internal fascia, which is usually drywall. This is referred to as "thermal bridging." Aerogel, a Nasa cryogenic insulation technology, is one of the most effective thermal insulation materials, and Thermablok, a US spin-off, has adapted it using a proprietary aerogel in a fibreglass matrix. This can be used to insulate studs, which can considerably increase the overall wall R-value (an industry measure of thermal resistance) by more than 40 percent.

Photovoltaic glaze

Photovoltaic Glaze is a type of coating that is used to protect solar panels by converting the entire building envelope into a solar panel; glazing integrated photovoltaic (BIPV) can assist buildings in generating their own electricity. Poly solar is a company that manufactures clear photovoltaic glass for use as a structural building material in the form of windows, facades, and roofs. Polysolar's grazing material is effective at producing energy even on north-facing, vertical walls, and because of its great performance at elevated temperatures, it may be double glazed or insulated directly. Similarly, while building and structure costs stay the same while cladding and shading system costs are replaced; its cost is just somewhat higher than standard glass.

Kinetic footfall

Another technology that is being developed is kinetic energy. Pavegen is a company that develops technology that allows flooring to capture the energy of footsteps. It may be used indoors or outdoors in high-traffic locations, and it uses electromagnetic induction technique and flywheel energy storage to create electricity from pedestrian

footfall. The Kinetic footfall is particularly effective at transport hubs with a high volume of people passing through. So far, the company's deployment has been at a football pitch in Rio de Janeiro to assist power the pitch's floodlights. It includes a temporary installation illuminating street lights outside London's Canary Wharf station. These are a few of the most significant.

Kinetic highways

Underground Power, an Italian firm, is investigating the use of kinetic energy potential in highways. Lybra is a tire-like rubber paving invented by the business that converts the kinetic energy produced by moving cars into electrical energy. Lybra is based on the premise that a braking car releases kinetic energy. It was created in partnership with the Polytechnic University of Milan. This cutting-edge technology can collect, convert, and transmit kinetic energy to the electricity grid, as well as improve road safety. The gadget also enhances and promotes the long-term sustainability of road innovation in building.

3D modelling

The growth of smart cities has fueled the development of innovative planning approaches. For this goal, Cyber City3D developed geospatial modelling software that specialises in the creation of smart 3D building models. With CC3D proprietary software, it assists in the creation of smart digital 3D buildings to assist the architectural, engineering, and construction sectors see and share design and data. These models can transmit 3D urban building data to Cesium's open architecture virtual 3D globe and can be connected with 3D geographic information system platforms like Autodesk and ESRI.

Modular construction

It refers to a structure built off-site with the same materials and to the same specifications as traditional on-site construction. It also aids in reducing environmental impact, providing components as needed and turning building into a logistical exercise. It also has considerable environmental benefits, such as fewer car journeys and reduced trash. This technology enables for the production of up to 70% of a building as components, allowing for "just in time" manufacturing and delivery. This technology is currently prevalent in the United States and the United Kingdom, with a 57-story building just constructed by Chinese developer Broad Sustainable Building.

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