

Tackling the Emerging Challenges of Off-Site Construction

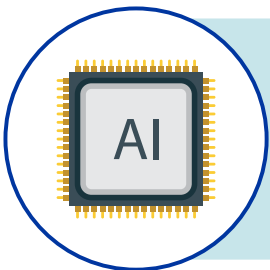


Off-site construction, which involves prefabrication and modularization of building components, offers promising solutions for increasing productivity, improving safety, reducing waste, and addressing construction labor shortages

However, its implementation is fraught with challenges



This ASCE collection sheds light on tackling technological, managerial, and organizational challenges plaguing off-site construction with innovative insights from theoretical and applied research

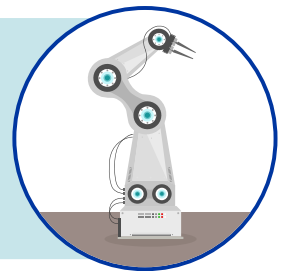


Artificial Intelligence, automation, and robotics:

- Integrated technology for large-scale modularization
- Intelligent postconstruction management
- Interdisciplinarity and interoperability
- Moving beyond technical solutions

Robotic collision avoidance:

- Collision-free workspace and collision-avoidance path planning
- Balance between safe-tolerant design and on-site robot planning

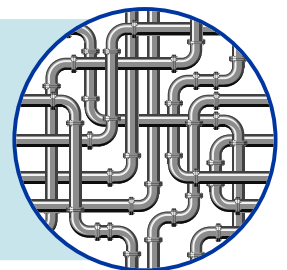


Organizational resilience analysis:

- Uses building information model and decentralized collaboration platform
- Suggests the need for improving the efficiency, robustness, and flexibility of prefabricated construction projects

Construction in remote areas:

- Optimization of modularity of plumbing systems using fuzzy logic models and non dominated sorting genetic algorithm
- Installation cost reduced by 81.9%

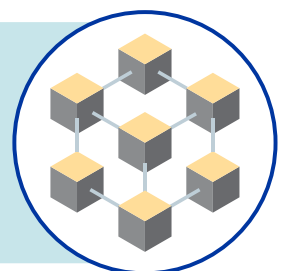


Improving efficiency in off-site construction:

- Assessment of digital twins to automatically reassign multiskilled construction workers
- Waiting waste, total production duration, and cost reduced by 62%, 40%, and 25%, respectively

Supply chain coordination:

- Through a sensor-integrated hybrid blockchain system
- Collects, stores, and shares information
- Based on automated contract execution



This collection highlights research efforts that will bring innovations to the construction industry, promoting the deployment of next-generation off-site construction