



Exploring the potential of modular construction in the Gulf

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What is modular construction?

Modular construction is an emerging trend in the Middle East. But what exactly is it? The innovative technique takes construction away from the hustle and bustle of a typical building site and places it in a controlled factory setting. The built elements are then transported to the designated site and assembled there.

With this approach, a construction project enjoys improved efficiency, thanks to better management of processes under a single roof. What is more, modular construction sections, or 'modules', adhere to the same standards as traditional construction, with the prefabricated components using materials that would commonly be found on a conventional site. The result? A building that mirrors the original design intent and specifications of its architect.

Modular construction presents a promising solution to the complexity of on-site construction. It is also a step towards a smarter and more efficient future for the construction industry in the Gulf, one that is being embraced with open arms. Indeed, the permanent modular construction industry topped \$2.9 billion in GCC (Gulf Cooperation Council) countries in 2020 and reached \$3.4bn in 2023. This growth is expected to continue, with the local industry forecast to reach nearly \$5 billion by 2029.

Embracing modular construction

One company that is putting this technique into practice is LINQ, a subsidiary of ALEC Construction and Engineering in Dubai. As explained by Bashar Kayali, managing director at ALEC Solutions, during a conversation with Accuracy in the Construction Insights series, modular construction moves traditional building from a building site to a factory: 'It is a different method of making buildings.'

Embracing modular construction not only enables faster project timelines and enhanced cost efficiency but also aligns with environmentally friendly and sustainable practices. According to Kayali, 'If you want to reduce carbon, if you want to go fast and if you want to go with good quality, you need to find some new methods – modular is one of them.'

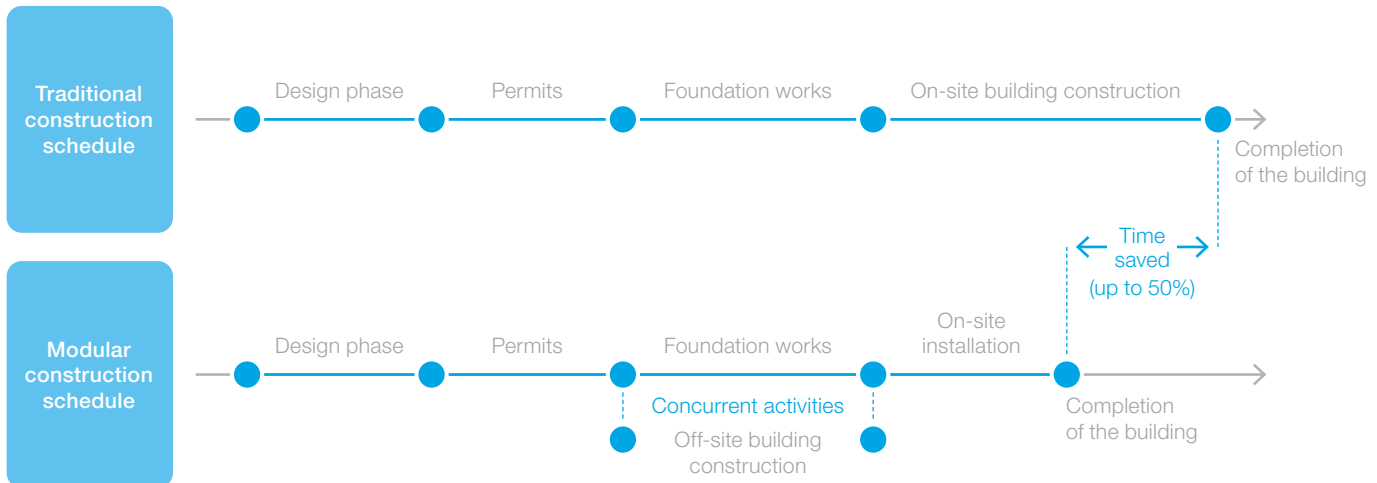
Faster timelines and greater coordination

One major advantage of modular construction relates to project timelines. The approach not only streamlines schedules; it also minimises the risk of delays. By building modules and performing on-site groundwork simultaneously, a modular construction project can be completed far quicker than its traditional equivalent.

In addition, modular construction can improve coordination between disciplines. Let us take, for example, structure work and MEP (mechanical, electrical and plumbing engineering). Consolidating these activities in one location allows for greater communication and interaction between them, a notable improvement over traditional methods.



Comparison of traditional vs modular construction schedules



Enhanced cost efficiency and sustainability

Implementing modular construction has a positive impact on overall project costs. Although initial costs may be higher, a comprehensive evaluation demonstrates significant advantages over traditional methods, reducing the potential for liquidated damages and cost overruns associated with delays.

Moreover, modular construction significantly advances sustainable development within the construction industry. Where traditional construction companies grapple with waste management challenges – an estimated 30% of building materials is typically lost as waste at construction sites, according to the Modular Building Institute¹ – modular construction minimises waste through precision cutting and assembly in a controlled environment. Indeed, a study by WRAP (Waste & Resources Action Programme) found that off-site construction can reduce waste levels to a mere 1.8%². And of that remaining waste, modular construction's factory setting facilitates more effective sorting and recycling.

The advantage of the controlled environment is therefore threefold: enhanced waste management efficiency, improved sustainability and increased cost efficiency.

Industry challenges

One key concern in the adoption of modular construction for a project would be relying on a single company throughout execution. That company would need to possess both capability and financial capacity: it would need to demonstrate its expertise in delivering the required modules, and it would need to have sufficient financial resources to deliver the entire project, given the typical payment structure in construction where project owners pay for materials only upon delivery.

Another challenge lies in having a skilled workforce and the necessary infrastructure for modular construction. This method requires a workforce with high levels of digital literacy, collaboration and adaptability, as well as reliable transportation and logistics infrastructure. Although some progress has been made in this area already – for example, in Saudi Arabia there have been significant strides in infrastructure development and workforce training over the past two decades – further developments must come to fully meet the requirements for modular construction in the region.

For unique and highly customised designs, the standardised nature of modules could prove troublesome: it may limit architectural flexibility, a hindrance that does not apply – or at least applies to a lesser extent – in traditional building. The standardised nature of modular construction could also make it difficult to comply with local building

Notes

[1] <https://www.modular.org/2021/07/14/the-environmental-impact-of-traditional-vs-modular-construction/>

[2] <https://www.modular.org/2021/07/14/the-environmental-impact-of-traditional-vs-modular-construction/>



codes and regulations. As a result, obtaining a permit for a modular construction project may face additional scrutiny, something exacerbated by the relatively novel nature of the method.

Another cause for concern is heavy dependence on suppliers. In modular construction, where building components are prefabricated off-site and then transported to the construction site for assembly, the project's success relies on a network of suppliers providing materials and components. Unlike traditional construction, where materials are often sourced and delivered as needed, modular construction requires precise coordination and timely delivery of prefabricated modules to maintain project timelines. Any disruptions or delays in the supply chain could significantly affect the construction schedule and financial viability of the project. This greater dependence on suppliers is a notable concern specific to modular construction, as it highlights the critical role of efficient supply chain management in ensuring the seamless execution of the construction process.

Finally, the transportation of modules via ships or trucks is subject to size and design constraints. This adds another level of complexity to modular construction logistics. What is more, during their transportation, prefabricated modules may experience damaging vibrations and stresses that could compromise the structural integrity of the piece and disrupt the entire installation sequence.

The future of modular construction in the Gulf

Modular construction is gaining traction in the Middle East.

The UAE and Saudi governments are both actively promoting sustainability and the reduction of carbon emissions. One way to do this is through the adoption of modular facilities, which can reduce the negative impact of the construction industry on the planet.

The regulatory landscape of the region may be advantageous. Compared with the United Kingdom or the United States, for example, it is generally less complex. Specific building regulations for modular construction are still evolving in the Middle East, and efforts are underway to enhance them.

The involvement of the private sector in modular solutions will also be key. The potential benefits of this new approach are considerable – and too important for it to be left on the fringes.

As a result, the convergence of government support and private sector engagement will be instrumental in advancing the adoption of modular construction, and their combined efforts will be crucial to improve regulations in this area.

This takes us conveniently back to LINQ, which recently achieved a major milestone: it secured a modular construction licence from the Dubai Municipality for a G+6 project. Bashar Kayali is excited at the prospect of implementing this innovative approach in Dubai's first six storey modular building. And while the G+6 project will initially focus on building up to six floors, he asserts that the method is not limited: 'We are not building a portacabin or individual unit... six is not the limit, we can go up to 20, 30, 40, 50 floors!'

When it comes to modular construction, it seems the sky is the limit!

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