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Sustainable Construction: Modern Approaches to Traditional Practices

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For centuries, we have been constructing everything from homes to manufacturing plants to transportation infrastructure, building on what we call traditional practices. Each decade moves forward with modernizations to these practices as our knowledge deepens and as we become aware of different resources. Building on those traditions has landed us where we are today; in a position of necessity for more sustainable construction practices. As mainstream construction techniques have progressed in speed and cost, there is a growing realization that continuing in this direction is having and will continue to have negative short and long-term impacts on our environment, our communities and our quality of life. To learn how we might remedy this situation, it helps to first take a look into our past.

Retro Sustainability

Long before steel girders and concrete blocks, we were building with what we had around us, making sense (whether out of design or out of necessity) of how our surroundings affected what we built. This included what resources we had access to and how they worked for the challenges we were facing.

In rural China, giant houses built as far back as the 12th century were constructed using local materials in a mixture of bamboo, stone, and wood, creating earthquake resistant walls while conserving significant energy in building and living. In Taiwan, there are villages planned around the prevailing winds to ensure alleyways that harness cool air off the sea. And in the Andes, the Uros people still build island houses out of reed they pull from the lake for its insulating properties.

In all of these societies, we can see how they achieved a sustained balance by realizing the simple but immutable truth about humans and their environments; for better or worse, they are irrefutably intertwined. For example, just looking at the materials we most commonly use today in traditional building, we've already strayed from anything sustainable. Concrete and steel, after all, are both non-renewable resources, are hard to reuse and require a lot of energy just to manufacture.

So, is the answer to go back to bamboo and stone structures?

Not exactly. We can, however, re-adopt the core principles of these historical techniques while adding today's best efficiencies enhanced by the right construction technology to come up with a new, sustainable construction industry.

Designing Sustainable Construction

First, we need to take a look at the way we design our projects. Ideally, the intent behind our designs should accomplish the following: Reduce negative impacts on the environment and humans while improving performance of the project for its design life. There are some principles that can used in this effort, which include:

- Optimizing site potential
- Minimizing non-renewable energy consumption
- Using environmentally preferable products
- Protecting and conserving water and water sources
- Enhancing indoor environmental quality
- Optimizing operational and maintenance practices

One example of this approach is what is referred to as New Urbanism where practices support these principles. These practices include neighborhoods that are diverse in use and population; communities designed for pedestrians, transit and cars; as well as architecture and landscape celebrating local history, climate and ecology. The main benefit of this type of design is to curb urban and suburban sprawl, which is associated with negative environmental consequences.

As we modernize our designs with these intentions, it forces a focus on each phase of the design for a holistic approach to the entire life cycle from procurement through operations and maintenance.

When our design is focused on sustainability, it opens the opportunity for our construction methods to also be focused on sustainability.

To this end, we can incorporate some proven sustainability watchwords, including:

- Conserve – to minimize resource consumption.
- Reuse – to maximize resource multi-uses.
- Renew/recycle – to use renewable or recyclable resources.
- Preserve – to protect the natural environment.
- Detox – to create a healthy, non-toxic environment, inside and outside.

We can also enhance those methods with technology. Though not yet an automatic thought when it comes to sustainability, technology is set to play a huge role in moving projects forward as they embrace true sustainability; economic, environmental, and communal.

From advances in 3D building information modeling or BIM, to paperless construction, cloud storage, mobile apps, and the power of automation, today's construction tech can help us achieve a sustainable construction project without tipping the costs into a negative balance.

Taking Action For Sustainable Construction

So, what is holding us back? It might be mistaken cost perceptions. A public opinion survey conducted by the World Business Council for Sustainable Development showed that while respondents believed that building green would add 17% to a building's cost, the actual cost increase was less than 2%. The truth? While the initial cost of using alternative materials and methods might rise slightly, if we consider energy, process, conservation, and labor improvements, we will often find that the added costs balance over time.

By using traditional practices and principles and applying modern approaches, we may not only come back into balance and protect our environment, but also grow our businesses more than we would have staying the course. The prospect of new, sustainable job creation, among other benefits, makes sustainable construction a wise investment for our economic as well as environmental future.

About the Author

Brandi Heffner is a Director at InEight. She drives the development of InEight Compliance, which solves regulatory compliance challenges for contractors, owners, and engineers. Prior to joining InEight, Brandi worked for Kiewit for 20 years as a document control manager, audit manager, and quality manager on multiple megaprojects, mainly in the civil sector. She also played a key leadership role in implementing a corporate-wide health, safety, environment, and quality (HSEQ) solution at Kiewit.

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