TOP STORY

Promising Tech

challenges bring opportunities, but . . .

By Christopher Scott D'Angelo

Challenging times can also be opportunities, but only if one knows where to look and has the drive—and capital—for it. Challenging times also highlight the need to anticipate and embrace new technologies—those who fail to, ultimately fail; those who do, benefit. This is true not only from the standpoint of competitiveness and profitability, but also to fulfill obligations to owners and clients, comply with regulations, provide an efficient and safe workplace for employees, and ultimately manage risk and successful projects.

Much has been written about the challenges presented by the pandemic and the all-too-well-known supply disruptions and labor shortages. While there has been some stabilization, the challenges remain substantial and in some respects daunting. Demand for materials is significantly higher as pent-up demand continues, while disruptions in the movement of materials due to congestion and delays in outbound ports in China and elsewhere and in inbound ports in the United States continue. This and the increased demand have also resulted in a substantial increase in freight costs. All of this leads to lack of materials, delays, and increased costs at a greater rate than seen in decades, and the further squeezing of margins for construction firms. And that is before getting to the challenges of the lack of labor, let alone qualified and experienced labor.

INDUSTRY OUTLOOK

In its 2022 Engineering and Construction Industry Outlook, however, Deloitte notes "several factors positioning industry for strong growth amid headwinds." The Associated Builders and Contractors' Construction Confidence Index has recovered from 38.1 at the beginning of the pandemic to well above 60 by mid-2021. Order backlogs (albeit a two-edged sword) is up significantly. According to a Deloitte survey, 91% of E&C respondents characterize the business outlook as somewhat or very positive, and they note the expected strong performance in both residential and non-residential sectors due to the Infrastructure Investment and Jobs Act. This is particularly encouraging for the non-residential sector as it had not had the successes of the residential sector in the past nearly 2 years. Nonresidential areas of focus will be related to data centers, warehousing, healthcare facilities, and, of course, roads, bridges, airports and other "infrastructure."

At the same time, owners and project managers are looking for efficiencies and flexibilities in their facilities so that management and maintenance therefor can be anticipated and handled well and economically, and cities are moving to be "smart" cities and requiring eco-friendly technologies, pedestrian or vehicle sensing technologies, sustainability, smart roads, waste management or Internet-of-Things (IoT).

PROMISING TECHNOLOGIES

To address these current challenges as well as anticipate future developments, and to find ways to stabilize and expand profitability, the industry must turn to, embrace and help develop new technologies. Some examples of promising or even compelling technologies are:

Digital supply networks. These allow for better visibility, control, and planning for supply availability and movement of materials, through analytics on real-time information allowing for better decision-making for scheduling, costing, strategic sourcing, alternative sourcing, bidding, and projections.

Smart project management systems. These help coordinate not only the supplier issues above, but contract management, labor staffing management, progress reports, progressing billing, and anticipation of speed bumps. They help increase productivity, speed access to current data, decrease downtime and disruptions, manage risk, and allow participants to be working across platforms and what otherwise might be disjointed data points in a coordinated and efficient manner.

BIM systems and Artificial Intelligence (AI). In addition to that described above, the use of AI will increase and assist greatly in predictive or collaborative building design and project planning.

Digital twins. Particularly combined with AI, these allow office or remote personnel effective "presence" on a jobsite to monitor activities and developments or coordinate and collaborate with on-site personnel.

New or modified materials. Such as engineered cementitious composite, engineered timber, and recycled materials, etc.

Prefabrication, 3D printing and modular construction. 3D printing is expanding greatly. No longer is it that little plastic toy novelty, but is now a sophisticated technology that can create, effectively and efficiently, many products, building components or models, and spare parts for on-site repair of construction equipment, out of a myriad of materials.

Robotics, autonomous vehicles or drones. Robotics are being used for many activities, especially for repetitive works such as bricklaying, fasteners setting, painting, loading, drywall installation, etc., or for dangerous activities such as demolition or explosive setting. Autonomous construction vehicles are in the works, and drones have increased in use dramatically.

Wearable sensors embedded in clothing or protective gear. These monitor worker safety or condition, providing for increased safety and decreased risk such as from exhaustion or environmental conditions.

Cloud technologies. By moving to and relying on the cloud, a firm's data is coordinated, real-time and available for the whole team for the sake of consistency and coordination.

Labor and management. Other areas requiring creative thinking and investment are both labor and management. To be sure, there is a very challenging labor shortage at present, but many think that this is not a temporary issue. The industry needs to find new or expanded ways to attract—and more important—train and retain qualified personnel. This is not only for the workers. As the industry creates and relies on roles that are digitally oriented or technology based, the workers and especially those tasked with the digital or tech activities will need greater and new skills. The competition from other industries for such candidates is strong and alluring.

CLOSING THOUGHT

Granted, these challenges and opportunities require a great deal of intellectual, creative, and financial capital. The reality is, however, that such investments are required to fulfill legal, professional, and contract obligations and to move successfully into the next era of the construction industry.

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