MODULAR ADVANTAGE

The Modular Solution to the Construction Labor Shortage

Healthcare and Education Case Studies

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Feature Story
Reinventing Construction – McKinsey & Company
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Streamlined Supply Chain
As single-source provider, Tremco helps simplify the material selection and ordering processes, saving you time and reducing costs.

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Our technical experts offer in-depth plant audits and guidance on product selections tailored to your application and budget demands.

Custom Small-Batch Solutions
Advanced R&D capabilities include application-specific product design and custom solutions to meet your specific requirements.

Comprehensive System Testing
Testing to AAMA and ASTM standards is routinely conducted at our state-of-the-art Sustainable Building Solutions Test Facility.

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Hello Readers,

As we have turned the calendar to 2018, I encourage you to make plans to attend this year’s World of Modular Annual Conference between March 22-25, 2018 at the Diplomat Beach Resort in Hollywood, Florida. This year we will be celebrating the 35th anniversary of the association, and the event is shaping up to be the best one yet. There will be opportunities for networking as well as chances to celebrate - and there will also be many opportunities to learn from global thought leaders including McKinsey & Company and the co-located University of Alberta’s Modular and Offsite Construction Summit. Registration information is included in this issue of the Modular Advantage.

I admit I am biased, but I believe that the modular industry is on the cusp of significant growth. This may make some wary, while others may rush to fill new opportunities. I truly believe we, the modular and offsite industry, are well positioned to solve issues that have plagued the construction industry for many years. This includes labor shortages, the need for safer working conditions, and less material waste in our landfills - not to mention project speed and efficiencies. It is truly an exciting time to be in our industry with all its challenges and opportunities. I truly love it!

MBI is entering its fourth year of a five-year effort to grow our part of the industries’ market share to 5% of all new construction starts. As I wrap up my year as President, I am pleased to share that based on calculations at the end of year three, modular construction sits at 3%. We are working tirelessly to achieve the goal of 5%, and are looking toward convincing more owners, developers and contractors to rethink the way they build. I urge you to read the guest article by McKinsey & Company called “Reinventing Construction” for ideas on how to start the conversation.

I appreciate serving as President this past year, and I thank you for supporting the Modular Building Institute. I hope to see you at the World of Modular in March!

Thank you,

Mike Rhodes
Silver Creek Industries
Chair, MBI Board of Directors

2018 WORLD OF MODULAR ANNUAL CONVENTION & TRADESHOW

March 22-25
Diplomat Resort Hollywood, FL

Thank You Sponsors
BIRMINGHAM, Mich., Nov. 03, 2017 (GLOBE NEWSWIRE) — VESTA Modular, a Simon Group Holdings (SGH) company announced it has completed the acquisition of substantially all assets of Touax Modular Buildings USA, LLC (“Touax USA”). The acquisition will add approximately 1,000 modules to VESTA’s fleet and provide the company new branch locations in Florida and Georgia. Current customers of Touax USA should not see any disruptions in their service.

This marks the second major acquisition completed by VESTA in 2017, adding nearly 2,800 modules and 35 employees to its team this year. “We believe very firmly that modular buildings represent a significant growth segment as the North American skilled trade market continues to tighten,” said Sam Simon, Chairman of VESTA.

With the addition of Touax USA, VESTA sees continued growth in 2018. “We are very happy to be adding the Touax employees and customers to the VESTA family and it really could not come at a better time,” said Dan McMurtrie, CEO of VESTA Modular. VESTA also announced that it had hired J. Collier Beall to lead its new branch location operations, naming him President, Fleet Services. Collier brings years of industry expertise and will be tasked with spearheading VESTA’s continued growth into new strategic branch locations.

Williams Scotsman Acquires Acton Mobile, Tyson Onsite

Williams Scotsman has completed the previously announced business combination with Double Eagle Acquisitions. The company now trades publicly under Double Eagle stock, under the new name of WillScot Corporation. Since the finalization of the agreement, WillScot has acquired Acton Mobile from Prophet Equity in a deal of $235 million.

The acquisition will give the company nearly 100,000 modular space and portable storage units serving approximately 35,000 customers from over 100 locations across North America.

The company also announced that it has acquired Indiana-based Tyson Onsite. Tyson Onsite will be integrated into the national operations of WillScot, and increases the company’s inventory by about 1,750 units.
The Modular Building Institute (MBI) is pleased to announce the addition of several new speakers to the agenda for its annual conference, including Steffen Fuchs of McKinsey & Company. Mr. Fuchs will be delivering his keynote session titled “Reinventing Construction Through a Productivity Revolution.” McKinsey Global Institute has been researching and studying the topic of construction productivity for years and published their findings in early 2017. See Steffen’s article later in this publication.

Popular construction industry economist Anirban Basu of Sage Policy Group will also be on the schedule, highlighting the potential opportunities for the modular construction sector.

This year, the conference agenda will focus on three themes:

1. Technology, Trends, and Innovation;
2. Business and Risk Management; and

Additionally, the University of Alberta’s Hole School of Engineering is co-locating its Modular and Offsite Construction Summit (MOCS) with World of Modular.

MOCS brings together the leading global researchers, academics, and advocates of offsite construction.

Other World of Modular highlights this year include:

- Professor Ryan Smith, University of Utah – Industry Growth Initiative Research and Feedback.
- Chris Giattina, Blox - The 2x2x2 Initiative: Making Buildings with Twice the Quality, Twice as Fast, at Half the Cost.
- Stephen Shang, Falcon Structures - Safe Use of Modified Shipping Containers.

Join hundreds of professionals at the industry’s “Can’t Miss” event of the year, this March 22nd-25th. This year marks the 35th anniversary celebration of MBI’s conference, the largest and longest running modular construction show in North America. The event will be held at the beautiful beachfront Diplomat Beach Resort in Hollywood, Florida, just north of Miami.

Register now at worldofmodular.org.
The global construction industry has a chronic productivity problem. Over the past 20 years, productivity has grown at only 1% annually, only around one-third the rate of the world economy and only around one-quarter of the rate in manufacturing.

While construction has appeared stuck in a time warp, other sectors have transformed themselves. Consider that in the United States between 1947 and 2010, agriculture achieved cumulative real growth in its productivity of 1,510% and manufacturing 760%. Construction managed only 6%. U.S. construction-sector productivity is lower today than it was in 1968, and investment has fallen over the past decade.

Research from the McKinsey Global Institute finds that U.S. construction accounts for one-third of a $1.6-trillion-a-year global opportunity to boost construction-sector productivity—the value that could be created by the industry if productivity matched that of the global economy.
Poor productivity in construction today is the result of a multitude of factors. The industry is highly fragmented, with a large number of small firms with lower productivity than the major global players. Current contract structures are often confrontational, which leads to disputes and change orders. And regulations are complex.

Underinvestment in technology is another root cause of low productivity. There is robust evidence of the link between the level of digitization in a sector and its productivity growth. The U.S. construction industry has invested 1.5% of value-added on technology, compared with 3.3% in manufacturing, and an overall average in the economy of 3.6%. In the United States, construction is the second-least digitized sector after agriculture.

What explains this lack of commitment to investing in technology? One reason is that construction overall tends to be a relatively low-margin industry, particularly for smaller players that simply don’t have the money to invest. Another is that many firms don’t recognize underinvestment as a key factor behind the sector’s poor productivity. In MGI’s Construction Productivity survey, respondents (mostly large companies in developed countries) listed underinvestment in innovation only seventh out of 10 root causes of low productivity in the sector.

However, our research finds that innovation can make an important contribution to turning this situation around. Gaining traction are digital technologies, new lightweight materials and advanced automation.

Of the three, digital technologies are spreading the most rapidly. Our survey revealed an adoption rate of more than 44% among respondents with more than 70% expecting to adopt them within the next three years. These technologies include user-friendly apps that enable real-time communication among crews, often loaded on hand-held and mobile devices, and 5-D building-information-modeling (BIM).

Use of such digital tools can address many of the core problems that beset the construction industry, including a lack of communication on complex sites, inefficient—and insufficient—design upfront leading to change orders and delays, and a lack of clarity on procurement and managing supply chains.

However, the biggest leap in productivity can be achieved by use of more prefabrication and standardization with buildings largely manufactured in factories and assembled quickly on-site. A five-to-tenfold increase in productivity would be possible if construction were to move to a manufacturing-like system of mass production with a much greater degree of standardization and modularization and the bulk of construction work taking place in factories off site.

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In the U.S., such approaches are increasing but are not yet the norm. In an August 2016 survey by the Associated General Contractors of America, only 13% of respondents said that they were investing in off-site prefabrication. There is a large opportunity for parts of the U.S. industry to reap huge productivity gains by moving more decisively in this direction.

McKinsey estimates that repeatable components and prefabrication in the industrial segment can generate an increase of 20-30% in value. In a McGraw-Hill survey, 6% of firms that used prefabrication and modularization reported a reduction in schedules, and 42% reported a reduction in cost of 6% or more.

Some of the most exciting developments are in developing economies. Take, for instance, new capabilities to print submodules or even complete concrete structures. In early 2015, Shanghai-based WinSun Construction, a pioneer of 3-D-printed structures, unveiled a six-story apartment building built entirely with a 3-D printer. In Dubai, a 2,700-square-foot office building was printed in 17 days at a cost of about $140,000. In October 2016, U.S. construction company Sunconomy announced plans to build the first 3-D-printed houses in the country.

One of the major hurdles to successfully making a transition to greater use of modularization and prefabrication is that, unlike manufacturing, construction is characterized by bespoke designs and unpredictable demand. Predictability of demand is vital if companies are going to invest in productivity—enhancing capacity and innovations because prefabricated elements tend to be more capital-intensive. MGI has found that an automated facility producing sufficient cement slabs and walls for 12,500 housing units could cost about $40 million. Only an assured level of demand can justify such an investment.

Innovation is everywhere—and is rapid because of digitization. The construction industry has a real opportunity to harness its power to save time and cost, reduce complexity, raise productivity, and create value. In conjunction with action on a broad front including reform of regulations and contracts, improvements in procurement and supply-chain management, and boosting skills, innovation has the power to unlock higher productivity in construction by moving toward this more manufacturing-style production system.

Steffen Fuchs is a partner in McKinsey & Company’s Dallas office and will be a keynote presenter at MBI’s World of Modular Conference on March 24th.
It is not too difficult to find articles citing the construction industry’s woes over the shortage of available skilled workers. All sorts of initiatives, efforts, and conferences have been held on the topic for the last decade or so in an effort to reach more young people and gain more entrants into the industry.

According to the Bureau of Labor Statistics (BLS) and National Association of Home Builders (NAHB) there are currently 143,000 vacant construction positions nationwide. And these job openings are not minimum wage positions either. BLS data shows that the mean wages for a person in the non-residential building industry is just over $25 per hour. Of course, this is a general average among all trades and regions, but certainly respectable pay.

A recent survey by the NAHB revealed that 69% of its members were experiencing delays in completing projects on time due to a shortage of qualified workers, while other jobs were lost altogether. And the problem isn’t going away anytime soon.

According to the 2015 Workforce Survey Results from Associated General Contractors (AGC) of America, over 60% believe it will continue to be hard to hire or become harder to hire construction professionals. In 2010, the average age of a construction worker was 40.2 years. By 2016, that number rose to 42.7 years, demonstrating that the workforce continues to age.

**The Modular Solution to the Construction Labor Shortage**

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So, if we have nearly 150,000 openings at an average of $25/hour, why can’t we fill these jobs? In our opinion, it comes down to three things:

- Lack of workforce training
- Culture of inefficiency
- Working harder, not smarter

Lack of workforce training – Just because there are 143,000 openings now, doesn’t mean there are 143,000 qualified people to do the work where it needs to be done. Over the past decade, U.S. educational policies and resources have shifted more towards college readiness, at the expense (we think) of vocational training programs. Local, state, and federal policy makers need to recognize and support the value and importance of community colleges, apprenticeship programs, and vocational training on our economy. (See sidebar story on TRACOM).

The outlook for the construction industry, in terms of job opportunities, is strong. On their website, BLS states: employment of construction and extraction occupations is projected to grow 11% from 2016 to 2026, faster than the average for all occupations, a gain of about 758,400 new jobs. Overall growth in the economy and population will increase demand for new buildings, roads, and other structures, which will create new jobs in construction and extraction occupations. The median annual wage for all construction and extraction occupations was $43,610 in May 2016, which was higher than the median annual wage for all occupations, which was $37,040. If we can’t find workers now, where will we find the three quarters of a million more workers needed to fill these positions?

Culture of Inefficiency – In the construction industry, nearly 42% of all workers are employed by “very small employers” (defined by the U.S. Census Bureau as fewer than 20 people). That is nearly 2.5 times the national average of 17.6% of all workers in all industries employed by very small firms.

Many of these very small employers have little to no experience with the challenges of owning and operating a business. Specifically, smaller contractors struggle with recruiting, screening, and training new employees, navigating the human resource requirements, offering and managing fringe benefits, and regularly evaluating and promoting workers. “Training” consists almost exclusively of on-the-job experience.

So, it may not be a huge surprise to learn that safety has been, and continues to be, an issue in the construction industry. The BLS reports that there were 985 industry fatalities in 2015, up 5% from 2014. There was also a 15% increase in the number of reportable injuries and illnesses, according to that same 2015 AGC workforce survey.

These issues lead to higher costs, higher turnover, lower productivity, and lower employee morale. Within the private sector, workers in manufacturing had the highest tenure among major industries, at 5.3 years in January 2016, compared to 4.0 years for the construction industry (BLS).

Working harder, not smarter – The reality is actually the opposite of the old saying we’ve all heard 1,000 times. When it comes to construction, the answer always seems to be “we need more people.” The construction industry is one of the few remaining industries so heavily reliant on physical labor, embracing the “next man up” mentality. No time for training, gotta get the job done on time.

According to McKinsey Global Institute: “Consider that in the United States between 1947 and 2010, agriculture achieved cumulative real growth in its productivity of 1,510% and manufacturing 760%. Construction managed only 6%. U.S. construction-sector productivity is lower today than it was in 1968, and investment has fallen over the past decade. Over the past 20 years, productivity has grown at only 1% annually, only around one-third the rate of the world economy and only around one-quarter of the rate in manufacturing.”

What’s the Message?

Is it any wonder that younger people are NOT entering the construction industry? Our policy makers place little to no value on vocational training. Small employers are more focused on selling the next job than training and retaining employees. Fringe benefits? Steady paycheck? Maybe, maybe not. Hard work, harsh outdoor environments, risky working conditions? Highly likely. Cool stuff like technology, automation, building information modeling? Not at most of the construction companies – no time, budget, or appetite for those things.

The Modular Solution to the Construction Labor Problem – Industrialization

Currently, the modular industry in the United States accounts for about 3% of all new building and home construction starts, a much lower adoption rate than in other developed nations. In Japan, for example, nearly 20% of all homes are constructed with an industrialized or prefabricated process. Sweden has the highest adoption rate with a whopping 84% of detached homes prefabricated.

There is a major difference between the US (and Canadian) industry compared to other European and Asian countries. In North America, we still CONSTRUCT buildings piece-by-piece, nail-by-nail, site-by-site, with all the variables, conditions, and challenges associated project-by-project. Other countries approach their construction industry with a manufacturing and assembly focus. They think in terms of processes instead of projects with a goal of minimizing waste and inefficiency.

The Japanese are experts in lean manufacturing techniques. They used this expertise to “school” the U.S. auto industry in the 1970s-80s. They also transferred their knowledge and best practices from
their auto industry to their construction industry. Today, about seven major modular home factories in Japan crank out over 100,000 homes annually. That’s more than the entire U.S. modular home industry. Ironically, the U.S. auto industry did eventually learn this lesson and now assembles cars made up from components manufactured at other plants. It no longer takes a mechanic to build a car.

Another major difference in adoption rates is that other governments are banking on and supporting industrialization and manufacturing efforts. The U.K. government recently announced a deal with a Chinese company to open six manufacturing plants in the U.K., employing U.K. citizens and building 25,000 housing units for the people of the U.K.

Now, at this point you may be thinking that industrialization of the construction industry would mean FEWER workers needed. Possibly. More accurately it would mean workers with a slightly different skill set are needed.

Japanese modular home manufacturer Sekisui Heim, the house-building segment of the Sekisui Chemical Company, is one of the largest modular home manufacturers in the world. The company employs nearly 4,000 people at their eight manufacturing plants, which produce over 1,000 homes each month. Simple math shows that on average, 4 workers build one home each month.

Many countries are embracing industrialization in part due to difficulty in finding labor, but also due to the high demand for more affordable housing inventory. In the U.S., we currently have:

1. A shortage of skilled construction labor.
2. A shortage of decent, affordable housing inventory.
3. A vastly under-utilized manufacturing base/infrastructure.
4. A need for more stable, predictable jobs.

The modular industry can offer more predictable work locations and hours, less labor-intensive work, a higher degree of technology integration in the work place, and much safer working conditions.

We can serve as a catalyst for the major rebirth of the US manufacturing base, creating thousands of new jobs while addressing our own massive infrastructure needs. It just makes sense, doesn’t it?

Now, here’s the kicker — if U.S. construction industry and policy makers DO NOT endorse/encourage/support the industrialization of the construction industry, it will happen anyway with someone else in the driver’s seat. Foreign investment will continue to flow into U.S. construction markets. We can encourage investment in our manufacturing capabilities, or we can keep trying to sell buggy whips, rotary phones, polaroid film, and beta max movies.

Training Program Provides Skills and Credentials for Industry.

TRAMCON (TR(A)ining for Manufactured CONstruction) is a $10M grant-funded program through the U.S. Department of Labor. TRAMCON is a consortium of 4 Florida colleges (Miami Dade College, Santa Fe College, Polk State College, and Seminole State College) selected to provide a tuition-free training program in manufactured construction.

The purpose for the development of the TRAMCON program is to provide training for the manufactured construction industry in order to increase productivity and reduce turnover of employees through training and education. To date, the consortium has 1,744 participants, 1,356 completers, and 1,687 certificates earned.

Santa Fe College has had amazing success stories with these participants. One participant who had been unemployed for quite some time completed the foundation level of training and was placed in a job in a local woodworking shop. He continued the TRAMCON program and completed Basic and Advanced Levels while working full-time. Another participant came in as an unemployed veteran. He had previous construction experience, but had no credentials or certification to show for it. He completed the foundation level of training and gained employment with a local company that manufactures and builds theme park attractions and decorations. He has since been promoted from his original position and loves his job!

The program is currently in the wind-down stages of training and will end on March 31, 2018. The participating schools are now looking for ways to assist employers and industry leaders in educating and training employees in manufactured construction. Over the past two and half years using the TRAMCON model, the program administrators have a good idea of best practices, what works, and how to best deliver manufactured construction training. The goal is to see TRAMCON continue as either a short training program, a pre-apprenticeship model, or a full apprenticeship model.

If you are interested in learning more about this program, contact MBI for program details.
One-on-One Interview with John Buongiorno of Axis Construction.

MBI: Tell me a little bit about your company – how long have you been in business? Have you always been a “modular contractor?” How many modular healthcare projects have you done?

Axis Construction Corp. was founded in June 1993 and has been widely recognized as an innovator in construction, design and management services, consistently raising the industry standard for the building community.

Axis’ primary focus has been and remains in healthcare construction, with a team approach that encompasses pre-design consultation, on-site project management, and post-construction follow-up.

In 1999, Axis established a division dedicated to modular construction which enhanced the method of delivery options available to clients. Since then Axis has completed well over 25 healthcare modular projects.

Some completed projects include MRI and CT scan suites, a stand-alone linear accelerator clinic, an emergency room addition, a 13,000 sq. ft. health care clinic, a 22,000 sq. ft. health care clinic for special needs patients, and the company is currently completing a 19,000 sq. ft. healthcare clinic in NYC.

MBI: What do you see as the biggest advantage for using modular construction for healthcare projects?

By far the greatest advantage of “modular/off-site” construction is its speed to market. Most of the facilities we construct are revenue producing properties for our clients, meaning earlier occupancy translates directly to earlier cash flow. Additionally, the speed allows our clients to be able to provide new technologies before the competition, and that makes modular construction incredibly attractive.
MBI: Are the owners/developers generally receptive to the idea of modular construction?

We have found that once the potential client has a full understanding that this method of delivery is no different than conventional construction in terms of codes, finishes, MEP systems, etc. they quickly embrace the concept and proceed with it. Also, with our portfolio of completed projects, seeing is believing and that makes our job that much easier.

MBI: One of the most common questions we get at MBI is about the cost of a modular project compared to a similar site-built structure. How would you answer that question?

We get asked that question all the time as well and it is a difficult one for sure. The bottom line is this—for the type of projects that we focus on and deliver, modular construction is “cost neutral” when comparing only a square foot cost to conventional construction.

However, while the cost per sq. ft. is approximately the same, “modular/off-site” constructions allows the client to provide and bill for services 33 – 50% sooner because of the shortened construction schedule and quicker occupancy.

MBI: Do you see healthcare as a growing market for the modular construction industry?

We see the opportunity for expansion in the healthcare market for modular construction. More and more, we are seeing the services being moved away from the mainstream hospital system to more neighborhood-based options. What we are looking at, and have been successful with, are full-service health clinics that are able to provide a multitude of services.

MBI: Thank you, John and best of luck in 2018!
Building at the Speed of Medical Innovation

We are at a crossroads in healthcare construction where the speed of medical innovation has outpaced the capability of conventional construction. Structures constructed using conventional methods cannot economically, easily or quickly be adapted to accommodate the latest therapeutic technology.
Imagine working on a structure for 134 years and still having another 10 years of scheduled construction! If your building’s function is rooted in religion, its value may never be diminished or lost; and perhaps the journey itself may be a spiritual one.

The Sagrada Familia is expected to be finished for the centennial of Architect Antoni Gaudi’s death in 2026. This Barcelona Cathedral started construction in 1882 and was consecrated in 2010 giving it a head start on providing services to its parishioners — if one can imagine calling 128 years after groundbreaking a “head start” History has recorded Gaudi’s response to the exceptionally long schedule as: “My client is not in a hurry.”

By contrast, imagine that your cancer facility took only several years to fund, design and construct and, when completed, was only the third medical proton facility of its kind in the USA. One would think it was pretty special, but the facility closed in 2014, just 10 years after opening due to several factors leading to obsolescence.

How fast are you building opportunity?

We are at a crossroads in healthcare construction where the speed of medical innovation has outpaced the capability of conventional construction. Structures constructed using conventional methods cannot economically, easily or quickly be adapted to accommodate the latest therapeutic technology. The Indiana proton facility closed during a boom in the market largely because it was unable to remain competitive with the newer proton devices. Moreover, the building was a slave to obsolete technology. The radiation activation from the cyclotron means that multiple isotopes in the concrete will remain above legal clearance levels for radioactively contaminated materials for decades. What value is this structure now? And could they have seen this coming?

The traditional 50 year useful lifecycle of a building has been turned on its head. Medical science is moving at the speed of Moore’s law doubling every few years while central planners imagine structures will continue to function for at least half the life of a cathedral. Along with technology are changing demographics, populations and markets which can likewise lead to facility’s obsolescence.

If you are part of the radiotherapy or nuclear industry, you understand the role of physics in both equipment and structures. Many will recognize the name Edward Teller, a theoretical physicist who worked on the Manhattan Project and later became known as the father of the hydrogen bomb. He was one of the titans of nuclear physics along with Oppenheimer, Lawrence and Ulam.

Today we have “Google X”, also known as the Moonshot Factory, which is the research and development subsidiary of Google focused on large scale changes and advancements rather than incremental, gradual changes. Their leader, “Captain of Moonshots,” is Astro Teller, the grandson of Edward Teller. He is a Stanford undergrad with a PhD in Artificial Intelligence from Carnegie Mellon University.

Astro Teller was interviewed by Thomas Friedman while writing his book, Thank You for Being Late, an optimist’s guide to thriving in the Age of Accelerations. The book, along with the Teller discussion, is an illustration of how accelerating advancements have outstripped man’s ability to absorb and adapt. If you were born in the Middle Ages, 100 to 200 years had little impact on how you lived. At the turn of the last century, the time in which lives were impacted by technological advancement may have been reduced to a generation or two, roughly 30 years or more. Today, Teller claims, new technology emerges every 5 to 7 years that makes that world feel “uncomfortably changed.”

And if it takes society 15 years to adapt, govern and feel comfortable around new technology, there is a gap between changing technology and our rate of accommodation. These shorter innovation cycles demand we take a new approach to challenges once solved by traditional methods.

The time of static stability has passed us by;” Teller is quoted. “That does not mean we can’t have a new kind of stability, but the new kind of stability has to be dynamic stability. There are some ways of being, like riding a bicycle, where you cannot stand still, but once you are moving it is actually easier. It is not our natural state. But humanity has to learn to exist in this state.”

So how does one apply “dynamic stability” to the construction of medical facilities? And perhaps, why should you?

“We have to stop thinking in cathedral time,” states RAD Technology Medical Systems President John Lefkus. “Speed to market and our ability to change have to be accelerated. Before concrete can cure, the next greatest solution may have already been introduced.”

"If accelerating technology has already passed our ability to adapt, Le/f_k us. “Speed to market and our ability to change have to be accelerated. Before concrete can cure, the next greatest solution may have already been introduced."
Building a Better Way

We can start by looking at advanced therapeutic medical facilities in terms of 5 to 15-year business cycles. Longer than that, you are just betting against technology. Here is where the traditional brick and mortar approach falls short. The protracted time to market, the lack of flexibility in adopting new innovations and 50-year expected economic lifecycle make pouring concrete yesterday’s technology. The “lock-in” to an unlikely 50-year lifecycle expectation is no longer tenable.

Institutional modular construction solves many of these challenges. The speed to market is often half the time or less versus traditional construction and it comes with key advantages. The modular structures, or parts of them, can be later removed, replaced or reconfigured with new modules catering to the latest technology. Perhaps more significant is that instead of using capital funds to invest in bricks and mortar, clients can simply rent or lease the solution for whatever period of time makes sense, often on par with the expected life of the medical technology. This eliminates balance sheet impairment and capital challenges while providing increased revenue and capabilities.

“After 35 years in specialty institutional modular construction, Lefkus shares, the superior quality of factory construction remains the industry’s best secret. Anyone who has spent time in the field knows how weather and physical conditions can impact quality. It’s not hard to imagine how a welder in a heated factory, working at a waste high jig, can perform better than one bundled in overalls on a 25 degree day working on a ladder with temporary lighting. With most adhesives and paints being water based today, the extreme temperature and humidity conditions in the field wreak havoc on all types of finish operations. And no one would dig a foundation by hand today when we have modern excavators that do a better and faster job. The same holds true with factory construction where factory fabrication methods are simply superior to field solutions.” Modular factory construction, like many manufacturing technologies, will continue to see accelerated innovation and improvements over conventional site techniques. The precision of CNC and robotic manufacturing will continue to offer greater accuracy and speed.

A great illustration on just how dynamic a medical modular structure can be is the installation of a fully functioning radiotherapy facility over the course of one year produced by RAD. This structure houses a 10 MV linear accelerator generating x-rays up to 250 times the energy of most conventional diagnostic devices. Before you criticize the one-year time frame of being good, but not great, you need to know it was installed three times in three different cities spanning 2,400 miles over the course of that year. Starting in New Hampshire, and with a stop in Colorado’s Vail Valley before going on to Idaho, the TRV was repeatedly erected in about 14 hours and made ready in only 5 days.

Just the installation and commissioning of the average medical accelerator usually takes over 100 days and yet RAD provides pre-commissioned equipment and the entire facility in just over 100 hours. This is stability while moving and what dynamic innovation looks like. Without the use of an interim facility and equipment provided by RAD, cancer treatments for patients could be stalled for several months while institutions upgrade their equipment and perform renovations.

“Not content to merely match the old norms, I have sought out opportunities in my career as a modular builder where factory construction can outperform and achieve superior solutions over traditional construction, states Mr. Lefkus. “Many of our clients, confronted with a choice between taking a chance on our modular approach or simply doing nothing, have recognized the value and witnessed the power and versatility of our approach.”

Accelerating advancements are served optimally by factory structures such as those deployed by RAD Technology. These solutions fit comfortably into the 5 to 7-year innovation cycles and bring new economic solutions that accompany the new technical ones. With the dawn of telemedicine, remote learning and online retailing, the current brick and mortar facilities that serve the outdated models will find it difficult, if not impossible, to repurpose themselves in the age of dynamic stability.

How fast are you building opportunity?

RAD Technology Medical Systems is a design-build construction company that provides revolutionary modular building systems for the healthcare industry complete with equipment and lease options. These turn-key solutions are factory fabricated eliminating the need for lengthy on-site construction and can be temporary, interim or permanent. For more information, please visit radtechnology.com.
Yelm School District desired a practical and temporary 8,200 square foot classroom solution, all under one roof, to house their growing student population. This structure was designed and contracted with efficiency and reusability in mind. It features six classrooms, two restrooms and two computer laboratories. The classrooms are situated along a corridor that runs the length of the building, simplifying accessibility within the building and allowing for a similar interior feel as the main school. The building’s exterior lap siding and roof were also designed to match the surrounding buildings. The design was challenging as the existing terrain was rocky and required an exact footprint fit.

Utilizing modular construction in a temporary swing space scenario allowed the school district to best utilize funds and ensure that the quality classrooms were ready for the beginning of the school year without disturbing classes. The smaller tempered glass windows keep the building material cost low while providing higher insulation, creating more teaching wall space to the interior, and energy savings in the future. Motion light sensors throughout the building further assist with energy control savings.

Due to the design-build project delivery approach utilized on this project, Silver Creek was able to collaborate directly with the client on design considerations during the conceptual phase of the project to ensure the modular construction systems selected would support the design intent. The project consists of a three-story structure which houses an entire charter school campus and the related functional spaces. The building contains 18 classrooms, a kitchen, multipurpose space, administrative spaces, interior corridors, an interior elevator, and interior stairs. The building exterior features plaster with a bright color palette and aluminum glazing systems. The finished building reflects the coordinated efforts of all team members to provide a design focused experience.

Due to the complexity and scope of the project, the ability to perform the work in a factory environment provided the opportunity for significant cost reductions and increased quality control measures. Larger than typical modules were utilized to maximize the factory scope of work. The careful placement of the restrooms allowed those spaces to be enclosed on all sides within a single module and to leave the factory fully finished. Spaces that could not be enclosed due to size or location were partially finished in the factory and wherever possible the remaining finishes were pre-cut in order minimize the duration of work on site. The electrical distribution system was designed to utilize larger conductors and conduits to reduce the number of electrical connections made in the field. Where possible, the ductwork was designed to be installed within a single module which eliminated the need for horizontal connections in the field.
Raising the roof on modular building

The innovative MMHC hinged roof connector makes it easy to build a stick-frame roof in the modular factory that can fold flat during shipping. It’s been tested and load rated in multiple directions. The MMHC can be installed on one or both sides of the roof-rafter assembly.

Looking for innovation in modular building? Visit our website at go.strongtie.com/modularbuilding or call us at (800) 999-5099.

Case Study:

Ramtech Building Systems – Permanent School Campus

This project provides space for 24 standard classrooms to accommodate up to 528 additional students. The building has five special-use classrooms for the school’s art, music, speech, and special education programs. It also includes a cafeteria with a warming kitchen, administrative offices, a library, tutoring center and learning lab, and a 3,000 square foot multipurpose exercise room with athletic flooring and a 14 foot ceiling height. We incorporated a mix of masonry and EIFS that complemented the existing structures and provided a cohesive appearance to the campus. Interior finish selections were largely driven by the educational use and included painted gypsum, resilient and ceramic tile as well as an acoustical drop ceiling.

Ramtech developed our Slab-on-Grade PMC System as an efficient means to provide concrete floors while dealing with the highly expansive soils found throughout Texas. Conventional pier and beam-PMC installations require a grade-beam or stem-wall foundation supported typically by under-reamed drilled piers. Then a conventional block pier supports a steel modular floor system with a corrugated steel deck and three inches of poured light-weight concrete. This redundancy of structures (expense of foundation and a modular floor system) adds considerable cost to the project. By utilizing a poured-in-place conventional concrete slab as prescribed by the geotechnical engineer, then placing a floorless module directly atop the slab, three things are achieved at a lesser cost: better floor acoustics due to more mass (quiet floors); a grade level entry is provided at all exterior doors; and there is no crawlspace to ventilate, greatly reducing the possibility of poor indoor air quality.
The Springfield Kids Dentist Clinic was designed with kids in mind. Unlike many pediatric dental clinics, this building is pleasing and fun to the kids’ eyes while not distracting them with costly technology used to ease a child’s anxiety with the visit. The goal of the client was to provide top notch affordable care while minimizing additional overhead costs. The flow of the clinic obtained by the design, and the work of the interior designer, creates a highly functional clinic without the high cost of unnecessary added features. The simplicity of the design allowed for a smooth and efficient set up on site without compromising the clients’ vision.

This project was built with a contractor who fully understands how modular works. This allowed for seamless timing between the completion of production in the factory, and the need for the project on site. We also worked closely with the contractor to delineate the scope of work to maximize the speed, efficiency, and cost savings of modular, while maintaining the flexibility needed to suit the client. The use of modular construction allowed for a reduced project schedule, early occupancy, and quicker return on investment.

Case Study:
Blazer Industries - Pediatric Dental Clinic

The Montreal Heart Institute (ICM) temporary emergency building layout, comprising 42 modular units, was carefully planned with various hospital departments to meet the technical and operational requirements to run a busy emergency room. Extra width was added to corridors on the first level to allow for two-way traffic of hospital beds. A variation in floor tile patterns was used to mark bed locations and designated waiting and triage areas. In some areas, the lower half of the walls have an Acrovyn protection panel to minimize wear and tear. Two nurse’s stations were installed complete with a call system for each of the 30 emergency bed locations and washrooms. The second level has spacious doctor’s offices. Large windows allow for natural light and contemporary finishes give it a less institutional feel. The install was carefully planned and executed from foundation upwards to meet the Level 02 elevator and corridor link to the hospital.

Because the building is only required for 4-5 years, and being on the neighbor’s property, it was essential the design be modular. The design includes module-to-module interconnections of all building services to minimize work performed on site. The replacement of surface mounted fluorescent fixtures in the crawl space with DEL lighting provides a more economical and more efficient lighting in a confined space. Redirecting the exhaust air from the suspended ceilings to the crawl space also provides ICM with a more economical and more efficient solution to heat and ventilate the mechanical crawl space. The use of driven and screwed steel pile foundation also provides for a more economical solution for dismantling at the end of project versus a standard concrete foundation. The “L-Shape” complex had the structural, electrical and mechanical building systems designed to be converted to (8) smaller single-story complexes post project at low cost.

Case Study:
ATCO Structures & Logistics Ltd. – Temporary Emergency Facility
Case Study:

Guerdon Modular Buildings – Retirement Facility

The Canyons Retirement Facility is a continuing healthcare community that offers varying levels of on-campus care, helping adults transition from home to a safe and dignified living environment. The project includes 40 assisted living rooms, 20 memory care rooms, public restrooms, staff areas, laundry facilities, community kitchens, libraries, dining areas, and a detached administrative building. The building’s layout has six wings, all connecting to central common gathering spaces: dining, crafts, the library and multi-use areas. Though a modular building, the smart use of space makes it hard to tell, especially while walking down a curved hallway that crosses diagonally through five modules. The abundance of woodwork and fine finishes go a long way to prove that modular construction has come a long way from the negative stigma of cheap manufactured homes.

The project broke ground in May 2016, the same time production of the modules began, and opened its doors one year from that date. Multiple modular innovations allowed for the fastened upfront schedule. Factory production and site preparation took place simultaneously. Factory production of the 54 modules (51 for the main building and three for an administrative building) was completed in just 35 days. Eighteen roof sections were built on the foundations (before modules arrived onsite), then craned off the foundations to make way for the modules to be set. The crane performed 90 picks over the 9 day install, with a total of 54 modules installed and 36 roof crane picks.

A lot of developer’s turn to modular construction for cost savings. This project did look for the financial benefits by way of speed to market but the main focus for this project was the required high tolerances and fine quality finishes. Great attention to detail coupled with finishes like marble, custom wood work and cabinetry have a major impact on the end user a critical time in their life. Modular construction provides a way to monitor quality and control it to meet that high bar.
Manufacturing Plant in Houston, TX

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