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*Cover Image: Built by Tecno Fast S.A., these relocatable modular classrooms in Lima, Peru have an abundance of daylighting and are surrounded by vegetation and sports fields.*
Hello!

As we all enjoy our summer, I’d like to encourage all of you to take a moment and review the MBI website (www.modular.org) and read all the amazing resources that have been created recently.

In staying with our 5-in-5 initiative efforts, MBI has created educational resources that are highly informative and available for all MBI members to use in their own promotional efforts. One major education resource is the online course “Introduction to Commercial Modular Construction” hosted by Clemson University. MBI members receive an exclusive discount to the course worth 1.5 CEUs. This is the perfect introductory material for new employees. Visit bit.ly/Clemson_Course to learn more!

Even more resources are available in the MBI Resource Library (bit.ly/MBI_Resources) including “A Guide to Architectural Design in Modular Construction,” “Saving Time with Modular Bathroom Pods,” and “Safe Use & Compliance of ISO Shipping Containers for Use as Buildings & Building Components.” Please take a moment to read and share these resources to participate in the growth of the modular industry.

In this issue of the Modular Advantage, you’ll find all the latest statistics for relocatable buildings. This annual data is yet another great resource in growing modular construction across all markets. MBI has partnered with The University of Utah and University of Alberta to provide a road-map for increasing construction innovation in the future. Please take 2 minutes and complete a short survey (bit.ly/PMC_Survey) about the perceptions of offsite construction in North America.

Thank you for your continued support of the MBI and have a great summer!

Sincerely,

Mike Rhodes,
Silver Creek Industries
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A MESSAGE FROM MBI’S
MIKE RHODES
PRESIDENT
From whitepapers to textbooks, MBI has created the best resources for learning more about the offsite modular construction industry.

**A Guide to Architectural Design in Modular Construction**

Modular construction works with all levels of design and construction with a sophistication that will exceed all expectations, rivaling its site-built counterpart.

Discover the WHO, WHAT, WHEN, WHERE, WHY, and HOW in the latest Guide to Architectural Design!

**READ IT HERE:**
bit.ly/ModularArchitecture

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**Introduction to Commercial Modular Construction**

The Modular Building Institute (MBI) worked closely with Clemson University to develop the book “Introduction to Commercial Modular Construction.” After the world-wide acceptance of this book as one of the go-to guides for understanding the modular industry, we have worked together to create a self-paced professional online course worth 1.5 CEUs.

**READ IT HERE:**
bit.ly/Clemson_Course
Understanding the Safe Use and Compliance of Modified Shipping Containers

The Modular Building Institute & National Portable Storage Association worked together to create a comprehensive resource to assist in understanding the safe use and compliance of modified ISO shipping containers for use as buildings and building components.

READ IT HERE: bit.ly/Modular_Containers

Saving Time with Modular Bathroom Pods

Considering using bathroom pods on your next project but don’t know where to start? Download a free guide to bathroom pods from the Modular Building Institute!

READ IT HERE: bit.ly/Bathroom_Pods_MBI

Permanent Modular Construction: Process, Practice, Performance

This research studies off-site modular production processes using case studies in international permanent modular construction (PMC). In addition to the comparative analysis, this report shares the results of an off-site industry survey, and a return on investment assessment demonstrates the lifecycle value of reduction in schedule as a result of modular.

READ IT HERE: bit.ly/PMC_WP
Join hundreds of modular construction professionals for our 35th Annual World of Modular in Hollywood, Florida! For 35 years, MBI has provided professionals in the modular building industry a place to network, exchange ideas, learn from experts, discuss issues, display new products and receive well-deserved recognition!

Visit bit.ly/WOM_2018_Subscribe for the latest updates
MODULAR’S FIT IN A BOOMING INDUSTRIAL CONSTRUCTION MARKET

As industrial construction maintains its record-breaking pace across the United States, modular is finding its place within the boom – bringing a cost-effective, time-saving, quality product to the market and receiving national television exposure that showcases its efficacy.

MODULAR AND INDUSTRIAL CONSTRUCTION TRENDS
Recent trends drive the fast-paced, ever-changing landscape of today’s industrial construction market. Strong consumer confidence and the continued increase in online purchasing are fueling the explosive growth of e-commerce, which remains a key driver in logistics-related development, according to global commercial real estate firm Cushman & Wakefield.

Bottom line, warehouse space is in high demand. As businesses continue to expand their warehouse capacity with strategically placed fulfillment and distribution centers across the country, some have turned to modular construction to build out these spaces with materials that are prefabricated and pre-engineered offsite – and they couldn’t be happier with the results.

BENEFITS WITH BOTTOM-LINE APPEAL
Modular construction is not new to the market space, but only in recent years has it gained recognition and a firmer foothold within an industry that is not quick to embrace change. Holding at three percent of the market share and poised to hit five percent by 2020, according to the Modular Building Institute, modular has been identified as one of the top 10 construction trends to watch in 2017 by Construction Dive.

The benefits are difficult to overlook and attractive to a business’ bottom line: fast product turn-around, quicker time to occupancy, cost savings, quality products, reusable/relocatable materials, significantly easier installation and aesthetic appeal. Additionally, modular requires less construction labor – an appealing consideration in an industry already challenged by labor shortages.

The many advantages of modular have some sitting up and taking notice, including Fox Business Channel’s television program “Offices Spaces.” The show, which highlights contemporary innovations in commercial property and design, featured modular design build company Allied Modular and its products and services in its most recent season. This nod to modular further validates the trend emerging in industrial space planning and construction.

ALLIED MODULAR’S “OFFICE SPACES” SOLUTION
Featured as the official partner to renovate a studio production building for the show’s client, BrandStar, Allied Modular delivers an impressive two-story modular office work space for 50 employees, which is pre-engineered and prefabricated offsite and effortlessly installed within a tight two-week time frame. Materials used support the show’s green initiative and client’s requirement to accommodate potential future growth, as they are reconfigurable, relocatable and reusable.

“Modular construction has gained a great deal of traction in recent years, becoming an emerging solution within the office and industrial markets,” said Allied Modular CEO Fred Ketcho.”
Our clients see lower, more predictable project costs and up to a 50 percent reduction in project implementation time over traditional construction. These solutions are extremely flexible and can be reused, significantly increasing return on investment.

“Office Spaces” selected Allied Modular for the project because their proposed modular system offered superior quality, short turn-around time, a “smart, stylish” design aesthetic and quick, easy installation that caused no disruption within the already-occupied work space.

I knew Allied Modular would be the best fit for my design project,” said “Office Spaces” host, Kalyn Rothaus, “not just because of their ‘go-green’ attitude and quick turnaround in manufacturing and installation, but also because they were willing to work with me as a designer – to really design a space that was right for the end user.”

Rothaus added the overall design and installation process were incredibly impressive. “The amazing thing Allied Modular was able to do was to have this whole system and not only was it going to look cool but as soon as they installed it and hooked it up to our power it was fully wired and ready to go. It was really plug and play,” said Rothaus. “When I was at their factory ... I saw all the custom work they were doing, and it was pretty incredible.”

View the “Office Spaces” episode featuring Allied Modular’s solutions and YouTube discussions with the show’s host at alliedmodular.com/officespaces.
Swedish Medical Center First Hill Campus located in Seattle, Washington was faced with the untenable challenge of continuing surgery while building a new hospital facility. The original sterilization department was housed in the basement of the building that needed to be demolished to make room for the new hospital tower and sterilization department. With the surgical suite located in a building nearby, they needed an interim solution that would allow them to temporarily relocate surgical sterilization during the construction process of the new 20 story tower.

With an aggressive timeline driving the project, they turned to RAD Technology Medical Systems to provide the solution. RAD’s factory-fabricated construction method allowed them to provide Swedish with a temporary and relocatable sterilization processing facility, complete with all the necessary equipment installed. This project allowed Swedish to easily relocate and improve their sterilization services and continue their program with no pause in surgery and no disruption to the construction schedule of the new tower.

This project was unique in that it was the first of its kind, but also in the fact that there were many design challenges to overcome in creating a facility that would meet all the necessary rules and regulations for sterilization. This was further complicated by the difficult site logistics very common on urban properties.

The first challenge RAD was up against was a very small postage stamp size site. The building was to be set on an existing physicians parking lot that was only accessible from one side. The other three sides have existing facilities on them. The surgical suite is located on one side, a medical office building on the second and an old office building slated to be demolished is on the third. The fourth side, although open, is on a busy Seattle street.

A typical sterilization processing program takes place on one level using about 14,000 sq. ft. The available site footprint only allowed for 6,000 sq. ft. This forced RAD to split the program into two levels and create a design that would allow for separation of clean and dirty spaces along
Taking the constraints of the site, location of the diesel tanks and requirements of the sterilization processing program into consideration, RAD designed with Perkins+Will a two-story, 12,000 sq. ft. steel and concrete building that meets all the same codes as a permanent structure including Seattle energy codes. The facility includes the highest possible fire rating because it is located so close to existing facilities, and part of the second floor is cantilevered over the diesel tanks. This allows the facility to command enough square footage to include all equipment and program space while keeping the area with the diesel tanks free and clear.

The RAD Sterilization Processing Facility is connected to the existing surgical suite in two places. One location is for all the sterile equipment to go into the surgical suite and the other building connection is for all the used non-sterile devices to enter the sterilization processing facility. Three modular elevators were installed to aid with the vertical transport of the equipment. One elevator is designated a contaminated elevator and brings all the soiled instruments into the sterilization facility on the ground level. The other two elevators are clean elevators and bring the sterilized instruments back up to the surgical suite.

with differential air pressures to meet sterilization guidelines. However, there was another challenge to overcome first. Diesel tanks are located underground at the site which feed the emergency generators for the hospital. These tanks could not be moved and RAD could not build on top of them.
The new interim sterilization facility needed to be completed prior to Swedish demolishing the hospital tower so time was of the essence. RAD partnered with STERIS, a leading provider of infection prevention and surgical products and services, to ensure the building came fully fitted with all the appropriate washing, decontamination and sterilization equipment required to support the entire sterile processing needs of the Swedish surgical staff during the construction of the new tower.

Most of the equipment was installed while construction was taking place at the factory. The equipment was then braced and secured for shipment and crane handling to ensure it would not get damaged while the modules were in motion. The integration of this equipment, which is normally placed on cast in place concrete to accommodate a host of functions including drainage, is now a patent pending solution developed by RAD.

RAD managed the field assembly of this project and took great care when dealing with the unique circumstances of the site. Deliveries were coordinated on an as needed basis and items were warehoused until required, due to the busy downtown area and limited space onsite. The site conditions also left no permanent entrances or elevators available for getting the remaining sterilization equipment into the building. To accommodate this, RAD built temporary loading platforms and used special reduced footprint forklifts to navigate the narrow space between the new building and the existing buildings. Because the remaining equipment had to be installed while the assembly of the modules was taking place, there was additional coordination necessary with floor and ceiling finishes, MEP connections and added safety requirements.

Since Swedish only needed the sterilization processing facility on an interim basis, the best course of action was for them to lease the facility and the equipment from RAD. This allowed Swedish to get the building and equipment they needed without having to use any additional capital. This is just one of many specialties enabling projects that RAD has available to meet various healthcare organizations’ needs quickly and efficiently.
WHY SPACE-SQUEEZED EDUCATORS SHOULD CHOOSE MODULAR FOR THE UPCOMING SCHOOL YEAR

When middle-school students at Magellan International School in Austin, Texas outgrew their classrooms, school administrators knew they needed to find a space solution for the 2016-17 academic year. Pleased with the portable preschool classrooms and primary campus office space they had leased from William Scotsman in the past, administrators now looked to the company for a customized solution for its middle school.

“Simply put, the space had to feel fresh and innovative; it had to inspire community and feel like a value-add at our current price point for middle-school tuition,” says Crystal Estrada, the school’s director of finance and operations. “Based on student and parent feedback to date, I would say that we were successful in accomplishing this task.”

MODULAR SPACE AND THE SCHOOL SYSTEM

Modular space has never been more important to the North American school system as it is now, as Magellan International School can attest. Here are a few reasons why:

• With about 180,000 units currently in use, North American school districts collectively are the largest users of relocatable classrooms, according to the Modular Building Institute. California schools own the most, with almost 90,000 units. Texas schools follow with about 20,000 units and Florida schools own about 17,000. These populous states and others will continue to need new and more space as aging and outdated facilities, overcrowded classrooms, growing student populations and shifting demographics impact communities everywhere. Research initiatives funded by private industry and alumni may also spur construction of new higher education facilities.

• There are 6,700 charter schools with nearly 3 million students across 43 states and the District of Columbia. With these kinds of numbers, it’s no wonder that charters have been a powerful force, (celebrating their 25th anniversary in 2016). Williams Scotsman has already helped solve space needs at charters, like Profectus Valor Academy in Jacksonville, Florida.

• There is an emerging trend toward privatization and designing schools for the real world – like Oracle constructing its own high school -- which may help counter-balance a decline in education sector construction due to stagnant high school graduation rates, as predicted in this December 2016 report.
From individual classrooms to multi-story school buildings and even entire university campuses, modular space products can assist just about any school system with temporary and long-term academic space needs.

THREE REASONS TO CHOOSE MODULAR FOR THE UPCOMING SCHOOL YEAR:

Decrease costs
Depending on your need, leasing temporary modular units can reduce operational costs. If you’re considering a long-term solution, purchasing a modular unit instead of leasing one may save you more over time. Consider using the power of a cooperative purchasing network such as the National IPA to procure your modular solution. The National IPA will save you time and money because a government entity acts as the lead agency, competitively soliciting and publicly awarding contracts to suppliers, eliminating the bid process.

Save time
Modular space partners can save the day for schools looking to quickly increase access to learning spaces for students. When Anawalt Elementary received some distressing news that its existing school building was being condemned, they had to act fast before the next school year commenced. Modular solutions provided a new school for students in three months.

Increase flexibility
Well-built modular classrooms are designed to meet both specific educational purposes and unique space challenges. Multiple design options, including a variety of sizes and add-on options including steps, ramps and awnings, can make temporary academic space blend harmoniously with an existing campus or stand out on its own.

For Magellan International School’s Estrada, collaborating with Williams Scotsman in designing modular classrooms was “the most fun, creative and easiest part of the process -- from adding a balcony on the second floor to adding floor-to-ceiling vinyl overlay walls, which students use for visual thinking; choosing balcony railings to selecting floor-to-ceiling windows for maximum amounts of natural light – they (Williams Scotsman) understood our need to push boundaries on what people consider ‘normal’ in classroom portables.”

Portable classroom solutions can offer a variety of instructional space options for every facet of the education market, including preschool, primary, secondary, college and university.
TECHNOLOGY, VERTICAL INTEGRATION MAY PAVE WAY FOR MODULAR ACCEPTANCE

By Mike Hoban

While many in the construction industry are well aware of the potential benefits of modular – reduced construction times, superior quality control, and potentially significant cost savings, those with experience building with modular also recognize the real and perceived limitations that keep modular from gaining wider acceptance. Although some misperceptions (such as the myth that modular is somehow of a lower quality) still dog the model, they will fade over time as forward-thinking construction firms continue to adopt the technology. However, some real issues remain.

One of the weaknesses of the multifamily modular manufacturing process has always been that there is little or no repetition from project to project, so the modular manufacturer has had to essentially build a different building every time. A second, more challenging aspect has typically been the lack of coordination between the architect, general contractor, and the modular manufacturer on projects. Those two realities greatly diminish the efficiencies that modular provides.

Recognizing these shortcomings, a number of firms – large and small – have begun to develop new technologies that address the replicability issue while simultaneously adopting a vertical integration model that streamlines the actual construction process.

In a position paper published recently by McKinsey & Company’s Global Infrastructure Initiative, Michael Marks, chairman and founder of Katerra, stated the dual problems more clearly. “The vast majority of building projects are still treated as one-off prototypes. While design and construction are full of highly repeatable processes, there is still no scaled systems approach to building. Instead, we start from scratch every time, sacrificing huge opportunities for time and cost efficiencies,” he wrote. “Fragmentation is another significant hurdle. The number of parties required to get something built is mind-boggling, with property developers and owners having to assemble teams that include architects, general contractors, subcontractors, and materials suppliers.”

Katerra is a San Francisco Bay area technology company that is trying to bring the efficiency of electronics manufacturing to construction projects. Founded in 2015, Katerra has developed an end-to-end design and construction platform that combines technology, design, material sourcing, manufacturing, logistics and construction into a single integrated system. And while Katerra does not fit the traditional mold of modular construction – stackable boxes – its factories produce a wide range of building components and materials (including lighting, cabinetry, truss assemblies, wall panels) that are then assembled on-site. According to the firm, it is now one of the top 25 multi-family general contractors in the U.S., with over $500 million in bookings in 2016.

Across the country in America’s other technology hub – Cambridge, MA – Arthur Klipfel and his firm, GreenStaxx, are also combining technology and a vertical integration model to persuade the construction industry to more fully adopt modular. GreenStaxx (which delivered a well-received presentation at this year’s World of Modular in Tuscon) is a
patented design system that utilizes a digital library of 23 pre-designed units that are “stacked” in a 3D program, and are designed and engineered – independent of any specific project – to be assembled like Lego blocks to fit any site, which eliminates the inefficiency of the “one-off” design. When coupled with a vertical integration strategy that fully engages all the stakeholders, it provides multifamily developers with a modular experience that can lower costs, improve quality and reduce construction time, according to Klipfel.

The firm has constructed a number of projects utilizing GreenStaxx in both modular and conventional construction modes, with one modular project, 30 Haven in Reading, MA, selected as one of five national finalists for the Urban Land Institute’s Jack Kemp Excellence in Affordable and Workforce Housing Award in 2014.

In order to successfully implement vertical integration on projects, GreenStaxx is in the process of “licensing” key multifamily stakeholders, training them in the implementation of the GreenStaxx technology to create fully integrated teams that will ensure an efficient and coordinated construction process. “What we’re providing with the GreenStaxx system is the vertical integration of the architect, general contractor, and the modular manufacturer, so that they’re operating as one company, marching to the same drummer,” says Klipfel, whose firm is preparing to develop its first multifamily (68 units) project with that licensed team in place.

Will the historically change-averse construction industry embrace these new technologies and finally adopt modular? Stay tuned.

Author Bio: For over two decades, Mike Hoban has worked as a Boston-based freelance writer specializing in commercial real estate. He is a regular contributor to the various publications of the Urban Land Institute, including Urban Land, as well as numerous commercial real estate publications.
The 5-in-5 research initiative led by Professor Ryan E. Smith from the University of Utah is aimed at aiding the modular industry in North America in the next 5 years. The research is focused on growth markets with an emphasis on permanent modular construction. The project consists of 3 elements: a North American survey of the traditional construction sector including architects, engineers and contractors as well as owners, developers, code officials and finance/insurance representatives; international interviews with offsite experts, and workshops at World of Modular.

The survey is intended to uncover the perceptions and experiences of stakeholders utilizing permanent modular construction. The survey is now complete and can be accessed at bit.ly/PMC_Survey. Please forward to stakeholders you have worked with in the past. The survey will run for 6 months to maximize the responses. The University of Utah team has been working with their constituents in the U.S. and with the University of Alberta and Dr. Mohammad Al-Hussein’s group to reach Canadian stakeholders. It is expected to get 500 responses or more.

The second part of the research is to investigate international contexts in which modular and offsite construction more generally has proliferated or is going through major growth at the moment. This is being done through live field visits to countries and through phone interviews. The research team has traveled to Sweden, Germany, Poland, and the UK. The team plans to visit Japan this fall and finish with a trip to Australia at the end of the year. Each country has unique social, political, economic, environmental, resource, regulatory and other factors that have given rise to offsite construction utilization. These country case studies are being developed and the lessons learned will be shared with the MBI membership so that a road-map for growth may be developed and carried out in our own market.

Finally, the research will take the knowledge gained from the North American survey and the international interviews and host a series of workshops at World of Modular. In March earlier this year, the research team held a workshop wherein MBI members were actively engaged in a SWOT analysis for the industry and aided in developing the previously mentioned survey and interview questions. This was furthered by an exercise at the MBI Board meeting in the summer. A second road-map workshop will be held at World of Modular 2018 in Hollywood, Florida and we welcome interested members to participate. The research team will then create a report of the findings of this research effort and outline a 5-in-5 road-map for growth in the North American modular industry.
The modular industry’s first and only labeling program dedicated to promoting high standards of honesty, integrity, professional service, and conduct.

The Modular Building Institute strongly encourages all of its manufacturer members in the United States and Canada to support the SEALS program by acquiring one MBI seal for each module (floor, box) manufactured. This revenue source will be earmarked and allocated towards addressing building code, regulatory, legislative, and legal barriers in the United States and Canada.

Additionally, we are encouraging all of our fleet owners to retroactively acquire one seal for each unit in their fleet that does not currently bear the seal. Any member experiencing issues in the US or Canada may request support from MBI’s Government Affairs Committee. Purchase your SEALS here bit.ly/MBI_SEALS

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**5 IN 5 INDUSTRY GROWTH INITIATIVE**

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Learning with Lightspeed Technologies Audio Solutions
at Freewater Elementary School

Freewater Elementary School, part of the Milton-Freewater Unified School District, serves students in grades four and five in the community of Milton-Freewater, Oregon.

With the need to replace an old, out of date school building, Freewater Elementary determined portable classrooms were the optimal replacement solution to meet current needs in a timely fashion. Today, two-thirds of its classrooms are portables and are mostly used for special education, reading intervention, and English as a second language classes.

Along with the benefits of portables to provide quickly deployed and flexible classrooms, they also presented some challenges. Looking for a way to improve audio quality, administration toured schools in similar situations to learn about possible solutions in use. They discovered Lightspeed Technologies Redcat all-in-one wireless audio system was being used to overcome classroom audio challenges. Freewater Elementary took action to try out two systems, and after a week of use the teachers in the trial didn’t want to give the systems back. The positive impact the Redcat had on teacher and student interaction was undeniable. Now, there is now a Lightspeed Redcat in every portable classroom.

“Aour portables get more noise from outside, because they are placed in rows 15 feet apart to meet our space needs. Noises like walking on the concrete sidewalks, teachers welcoming students to neighboring classrooms, doors closing, all coming in from the outside can be loud and distracting to students in the classroom”

Aaron Duff
Freewater Elementary, Principal

With Redcats’ audio voice amplification, there is no need to yell to be heard. “All sound is at an even level, not amped or loud. It’s comfortable and understandable, facilitating better behavior and helping students listen better and feel included,” said Principal Duff. The solution has allowed an even playing field for every classroom, and even those with quiet voices can be heard. Now, students speak up with confidence and enjoy using the microphone to speak.

The Redcat has become instrumental to providing every student access to a high quality education, respecting each child’s unique needs, interests, and potential. With the addition of new classrooms, portables and traditional, all teachers say they have to have the Redcat in the room. “You know you have a good thing when teachers don’t want to give it up when moving to a new classroom, and tell you they need it”, said Principal Duff.
Introduction to Commercial Modular Construction

The Modular Building Institute (MBI) worked closely with Clemson University to develop the book “Introduction to Commercial Modular Construction.” After the world-wide acceptance of this book as one of the go-to guides for understanding the modular industry, we have worked together to create a self-paced professional online course worth 1.5 CEUs. The course explores the process of commercial modular construction from the discussion of client needs, through design and fabrication, to transportation and installation of modules.

ORDER YOUR BOOK THROUGH MODULAR.ORG TODAY!

REGISTER FOR THE COURSE AT: bit.ly/Clemson_Course
The Offsite Construction Expo (OSCE) offers a focused presentation of the abilities of offsite construction across all markets. It features exhibits from offsite construction contractors, traditional contractors that have integrated offsite methods, offsite factories, transportation companies, architects, engineers, BIM suppliers, materials suppliers, and consultants of all types of offsite construction processes.

**There simply is no greater opportunity to reach key partners in the offsite construction industry!**
The MBI initiated the 5-in-5 industry growth initiative in early 2015. The goal was to focus resources and efforts on the goal of increasing the market share of the commercial modular building industry from its estimated 2.5% to 5% percent of all new construction starts by the year 2020.

While there has been growth toward the 2020 goal, MBI has seen an increased interest in key markets that if nurtured will push the modular industry well past the 5% target. The third quarter case studies showcase industry projects in the top 4 markets including education, healthcare, multi-family, and commercial.
TANGERINE POP UP

COMPANY: CORNER CAST CONSTRUCTION, INC.
LOCATION: WINNIPEG, MANITOBA
BUILDING USE: PROMOTIONAL POP UP
GROSS PROJECT SIZE: 320 SQUARE FEET
DAYS TO COMPLETE: 36

ARCHITECTURAL EXCELLENCE

A shipping container has been modified to create one hip, temporary store. The bright orange, white and natural wood styling lend a fun, vibrant and eye-catching look. The subtle patterns in the design add a vibrant spark, with appealing modern furniture. Simple touches such as the trimless seams are appreciated, especially in a small space like this, to keep everything looking clean. Raising the floor, creating the large window layout go a long way to make the space feel more open. The patio add to the charm and overall cohesive planning. Outside it looks solid and strong, but inside it is warm and cozy.
TECHNICAL INNOVATION & SUSTAINABILITY

The confined space challenged the design and production crew fitting in a fully autonomous plumbing and HVAC system, security systems to a banking standard and ADA accessibility, while maintaining the highest level of architectural finishing and interior. Where the container is given a second life it’s structural integrity allows for an extended life span for both exteriors and interiors. The factory built environment allowed our production team to build, install, test and prep for transport in 24 working days.

COST EFFECTIVENESS

The in house design and built allowed for design optimization for both product and production and respect the clients budget. The longer life span, thanks to the container structural integrity, and the low transport cost, due to the ability to transport the unit using existing intermodal shipping system, in combination with the ease of install makes the unit excel in low operational and maintenance cost.
EL SALVADOR TRANSITION HOSPITAL

COMPANY: TECNO FAST S.A.  
LOCATION: SANTIAGO, CHILE

BUILDING USE: HEALTHCARE  
GROSS PROJECT SIZE: 7,792 SQUARE FEET

DAYS TO COMPLETE: 217

ARCHITECTURAL EXCELLENCE

The major challenge in the construction of El Salvador Transition hospital was to design a functional building that could comply with all the technical requirements of the Chilean Ministry of Health and after the 48 months lease, be part of our lease fleet for other uses as temporary offices. The project was elaborated in 6 different buildings depending in the medical use; Otolaryngology, Psychiatry, Labs, Pesticides, Ophthalmology and dermatology and HIV.
TECHNICAL INNOVATION & SUSTAINABILITY

The special use of this building as a medical facility and having in thought that after the 48 month lease we will have to use the units as a typical space Rental unit, we design all the buildings with 18 sq m modules for an easy re-utilization and cost effective process. The 6 buildings were installed in the parking lot of the actual Hospital, meanwhile they start with the demolition and new construction.

COST EFFECTIVENESS

The complexity of the project and the small time for errors, made Tecno Fast the perfect option to complete the project in time, with work taking place in the plant meanwhile the client prepared the utilities and facilities to receive our on site team. The individual modules are completed in plant and send to site, saving money in expensive on site work. The modular system allowed meeting of deadlines initially considered for the inauguration of the building, allowing to start with the demolition of the old hospital and start with the construction of the new one.
ARCHITECTURAL EXCELLENCE

Triumph Modular transformed a 14,000 square-foot modular building that they had originally installed for EMD Serono in 2012 into a “class A,” state-of-the-art executive office space. Located on the EMD Serono Billerica, MA campus, the renovated office space is a biopharmaceutical working environment where Research and Development project teams can collaborate, communicate and share knowledge in the pursuit of new therapies for patients with unmet medical needs around the world. The open office space features workstations with flexible use for individual or cross-functional group work and is designed for optimal acoustics with sound absorbing materials. A variety of shared spaces foster collaboration and communication. Additionally, there are huddle and private interaction rooms, as well as a lunch/break room and café.
TECHNICAL INNOVATION & SUSTAINABILITY

Inherently green, the original EMD Serono office space was completely re-purposed from an already existing building. An upgraded, highly efficient HVAC system and a modernized fire alarm system were added to comply with the latest code cycle. A Greenguard certified insulation system ensures heat loss prevention and sound quality while Low-VOC interior materials including carpet adhesives and paint contributed to a healthy work environment. Carpet tiles were selected for their aesthetics while also providing ease of installation. Further, the lighting system was upgraded to an efficient LED system.

COST EFFECTIVENESS

The 14,000 square foot building consisting of 14 modules adhered to a strict timeline to ensure that there was no loss of productivity for the important medical research conducted in the office space. The project was completed in just eight weeks. Triumph worked with the project architect to develop value engineering strategies that helped reduce the overall cost of the project without compromising the integrity of the design. LED downlighting fixtures were selected as a cost-effective alternative to recessed housing, which reduced material and installation costs. Additionally, ceiling fins were replaced with more cost-effective ACT planks/clouds in the center aisle while remaining at the entry and collaboration zone of the building. Lastly the project utilized recycled doors, hardware, and frames.
ARCHITECTURAL EXCELLENCE

This new relocatable modular building project was designed with cost efficiency, ease of installation and low cost of life cycle ownership in mind. While this complex of structures is relocatable, the goal was to create a campus that was warm and inviting for the migrant worker families and children that utilize the structures. It was very important to the end user and the architect that the buildings have components and assemblies that are efficient from a maintenance perspective. Affordable Structures worked closely with the factory, the end user and the Architect to build a complex of buildings that achieved this goal. All of the buildings are Type II-B non-combustible and have renewable finishes throughout.
TECHNICAL INNOVATION & SUSTAINABILITY

Affordable Structures reviewed past projects with the client and developed a list of best practices of what had worked on other structures. The goal was to build the best value building from both a cost of construction perspective and also the cost of ownership from a maintenance perspective. We completed the elements that were best achieved at the manufacturing facility and completed the other finishes on site. To achieve an at grade primary entrance, we developed a stemwall foundation that faces the courtyard blended with below grade footings and isolated piers for the balance. This blend was effective from both a cost standpoint and a long term indoor air quality position. With outdoor relative humidity levels in the Southeast approaching 95%, we are very cognizant of developing solutions that help our buildings stay healthy.

COST EFFECTIVENESS

By working with the Architect and the Owner, Affordable Structures was able to develop a solution that we very cost effective in the total project cost. The campus concept with a central courtyard was exactly what the client wanted. They love the large play areas and covered canopies that allow the kids to play outside while still being protected from the elements. All of the finishes in the buildings are renewable and have a low cost of maintenance. Ceramic tile floors over concrete composite floor decking, breathable painted drywall over steel studs and densdeck with a single slope TPO roof all contribute to a solution that works great for the end user.
ABOUT THE MODULAR BUILDING INSTITUTE

Founded in 1983, the Modular Building Institute (MBI) is the only international non-profit trade association serving the commercial modular construction industry. Members are manufacturers, fleet owners and contractors of commercial modular building projects, as well as suppliers of building components, services, and financing. Members are located in 20 countries around the globe and provide all types of building space, from relocatable buildings to complex multi-story permanent construction projects. MBI’s mission is to grow the industry and its capabilities by encouraging innovation, quality, and professionalism through communication, education, and recognition.

Each year, MBI hosts World of Modular, the largest gathering of professionals in the modular construction industry. For more information about industry events, visit www.modular.org.

ABOUT THE MODULAR CONSTRUCTION INDUSTRY

Unlike the federally-regulated HUD-Code manufactured housing industry, the modular construction industry is regulated primarily at the state and local levels by code and agency administrators. As with site-built structures, the modularly constructed facility must meet the local codes where the building is to be located. There is no special “modular building code” or exceptions for a building constructed utilizing the modular construction process. It is simply a different and more efficient manner to assemble the materials and components of a building.

Modular construction can be utilized for commercial, residential, institutional, or industrial applications.

COMMERCIAL MODULAR BUILDINGS are non-residential factory-built structures designed to meet provincial, state, and local building codes. Commonly, these buildings are constructed in accordance with the International Building Code (IBC) or some code modeled after the IBC.

The commercial modular building industry is comprised of two distinct divisions, both represented by MBI:

RELOCATABLE BUILDINGS (RB) - Relocatable modular buildings are designed to be reused or re-purposed multiple times and transported to different sites. Relocatable Building as defined in the 2015 International Existing Building Code – a partially or completely assembled building constructed and designed to be reused multiple times and transported to different building sites.
PERMANENT MODULAR CONSTRUCTION (PMC) – PMC is an innovative, sustainable construction delivery method utilizing offsite, lean manufacturing techniques to prefabricate single or multi-story whole building solutions in deliverable module sections. PMC buildings are manufactured in a safe, controlled setting and can be constructed of wood, steel, or concrete. PMC modules can be integrated into site-built projects or stand alone as a turn-key solution, and can be delivered with MEP, fixtures, and interior finishes in less time, with less waste and higher quality control compared to projects utilizing only site-built construction.

This report provides an in-depth view into the relocatable building sector.

Permanent modular construction is covered in a separate report available from MBI.

RELOCATABLE BUILDINGS SECTOR:

MARKETS SERVED

EDUCATION

Relocatable buildings have become a critical factor in managing student demographics and increasing enrollments. Relocatable classrooms are also ideal for swing space during new construction or renovation. Convenient, flexible, cost-effective temporary buildings can be delivered and operational in as little as 24 hours. These classrooms are measured for quality and code compliance by state or third-party agencies through routine and random inspections, testing, and certification services.

Customers may choose single classrooms or arrange multiple buildings in clusters to create a campus feel. MBI members supply steps, decks, ramps and even furniture. Members also offer lease, purchase, and lease-to-purchase financing for a variety of public and private school needs. These classrooms are sometimes referred to as temporary, portable, or mobile classrooms.

School districts across the United States are collectively the largest owners of relocatable classrooms, with about 180,000. California schools own close to 90,000 units; Texas schools own about 20,000; and Florida owns about 17,000. Typically, larger school districts with high growth are more likely to own the units, which explains why California, Texas and Florida have so many. States like Georgia, North Carolina, Virginia and Maryland own and operate about 3,000 each.

CONSTRUCTION-SITE

Relocatable buildings have their roots in construction-site trailers, where speed, temporary space, and relocatability are important. Used as standard field offices, construction-site and in-plant buildings are available for immediate delivery. Standard construction is wood, but steel units are available to meet noncombustible requirements. In-plant buildings are available as single- or two-story units for industrial environments with noise-reducing insulation, and are typically moveable by forklift and include electrical and communications wiring, heating, air conditioning and even plumbing.
HEALTHCARE
Relocatable buildings for healthcare applications are designed and constructed to uncompromising standards of quality. A customer’s new clinic, hospital extension, laboratory, diagnostic center, MRI unit, dentist office or other medical facility can be open for business and serving communities in as little as a few days. Is your interest in serving patients as quickly as possible in the most-safe and aesthetically pleasing environments available? These facilities offer quick, quiet, safe, and clean buildings with an unlimited choice of interior décor, furniture and equipment leasing.

GENERAL ADMINISTRATIVE AND SALES OFFICE
When production demands increase, relocatable buildings can temporarily enlarge a current facility without permanent alterations to the site. Because the space is not permanent, many companies are able to expand without the budget approval process necessary for traditional capital expenses. Relocatable offices can be single- and multi-story buildings configured to include independent offices, conference rooms and large open spaces for cubicles or other partition systems. Large and small businesses, as well as local and state governments, are typical users of relocatable office space.

COMMERCIAL/RETAIL
Earlier occupancy means quicker return on investment. For retail occupancies, this can mean significant cash flow advantages. Standard floor plans are available for immediate delivery while custom buildings are built to specifications in weeks, not months. Unique to the modular process is concurrent construction: site work occurs at the same time that buildings are being put together in a quality-controlled factory.

Typical retail applications include new home sales centers, banks, golf pro shops, automobile fleet ownerships, college bookstores, and concession stands. If a client’s emerging business needs are short term, temporary space will accommodate their financial situation, space requirements and deadlines.

SECURITY
Relocatable buildings can be custom built for a variety of access and control situations. Toll booths, tickets sales offices, guard stands and weigh stations are common applications. One- and two-story wood and steel buildings have straight walls or walls that are tilted to improve views and reduce glare. MBI members supply a full line of portable storage containers for either short- or long-term. Heavy-duty storage units feature ground-level entry with double-swing doors for easy accessibility and are ideal for construction-site storage, equipment storage, warehousing, record-keeping, industrial manufacturers, retailers and others.

EQUIPMENT & STORAGE
Economical and convenient equipment and storage buildings offer onsite protection from inclement weather and theft. Day in and day out, relocatable buildings offer durability and strength. Equipment shelters for construction sites, chemical storage buildings, temporary generator housing and other applications are designed and built by MBI members to guard a client’s investment. These buildings can be as simple as steel containers to units that are heated and air conditioned with exteriors of brick, stone aggregate or stucco.

EMERGENCY/DISASTER RELIEF
There is simply no other means of providing fast, transitional shelter and basic community needs following natural disasters than relocatable buildings. Relocatable buildings can be quickly and efficiently deployed for emergency shelter, medical and educational needs, or to accommodate relief workers.
Since 1903, Gordon Brothers has helped lenders, operating companies, advisors, and investors move forward through change with services in valuations, dispositions, operations, and investments. Gordon Brothers provides valuation services and collect data on five of the larger fleet owners in North America and provided MBI with that aggregate data.

**PUBLICLY AVAILABLE DATA** gleaned from financial reports from companies such as McGrath Rentcorp (NASDAQ: MGRC), Mobile Mini (NASDAQ: MINI), Pac-Van (NASDAQ: GFN) and several Canadian companies with information available from SEDAR.

MBI collects **INTERNALLY GATHERED DATA** on its members when each renews its annual membership. The 2017 renewal cycle garnered information about revenues, markets, and fleet utilization for 2016. MBI obtained data from 24 of its North American fleet owners.

The data in this report represents about 75% of the industry owned assets and revenue of the relocatable buildings industry in North America. While we have made every effort to glean relevant data from all available sources and to make appropriate currency conversions when necessary, we caution that this report is based on the best available data and may not be representative of specific company activities.

In all, MBI obtained lease fleet data from Gordon Brothers on 5 North American lease fleet owners comprising 73,019 single wide units, 51,188 units in complexes and 16,573 classroom units. MBI combined this data with data sources internally obtained on 74,814 units from 24 additional companies, as well as public data for a total of 245,888 North American units, or about 75% of the total industry owned fleet.

It is important to note that not all data collected from each company was used in every statistical calculation. This report represents the most comprehensive single source of data on a diverse industry over a broad geographic region and within multiple markets and is based on the best available data.

Revenue from fleet operations reported from these sources totaled approximately $2.20 billion in the relocatable building sector. Some of the companies included in this data also generate revenue from other sources such as portable storage units and rental of other types of equipment. All financial information is in U.S. dollars unless specified otherwise.
SIZE OF THE MARKET

MBI estimates that there are about 525,000 code-compliant relocatable buildings in use in North America today. Public school districts across North America collectively own and operate about 200,000 relocatable classrooms, with the industry owning and leasing about 325,000 buildings. Additionally, many construction companies own a fleet of construction offices that move from site to site. These figures do not include “non-coded” units such as personal storage units, although these units typically make up about 15% of a provider’s fleet.

In recent years, MBI has seen a growth in the number of companies converting shipping containers into ground level offices. However, these companies are not generally included in this report. MBI is working to gain a better understanding of the size and scope of this niche of the industry and will include more detailed data in future reports. Absent those container companies, MBI estimates that there are about 70 North American fleet owners accounting for the 325,000 industry owned units, for an average fleet size of 4,642.

The 4 largest fleet owners control approximately 61% percent of all industry owned units in North America. Those companies include Modspace, Williams Scotsman (Algeco), Mobile Modular Management Corporation (McGrath Rentcorp), and Mobile Mini (steel ground level offices only).

A more accurate breakdown of North American fleet ownership is as follows:

The percent of units owned varies greatly by region as some of the larger players are more heavily concentrated in certain regions and less in other regions, while some of the mid-sized companies are more state or region focused. For example, a company with 1,000 units in a smaller region may have a greater local market share than a large fleet owner that is less active in that same region.

<table>
<thead>
<tr>
<th>NUMBER OF COMPANIES</th>
<th>% OF FLEET OWNED</th>
<th>NUMBER OF UNITS OWNED</th>
<th>AVERAGE FLEET SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>61.5%</td>
<td>200,000</td>
<td>50,000</td>
</tr>
<tr>
<td>8</td>
<td>18.5%</td>
<td>60,000</td>
<td>7,500</td>
</tr>
<tr>
<td>20</td>
<td>10.8%</td>
<td>35,000</td>
<td>1,750</td>
</tr>
<tr>
<td>38</td>
<td>9.2%</td>
<td>30,000</td>
<td>789</td>
</tr>
<tr>
<td>Total: 70</td>
<td>100%</td>
<td>325,000</td>
<td></td>
</tr>
</tbody>
</table>

BUSINESS OPERATIONS

Each year, MBI compiles data about the modular construction industry and each year, the public wants more information and detail. One of the challenges in gathering this data is the diversity among the industry participants. Modular construction in and of itself is not a NAICS category. Rather, our industry tends to fall under one of several NAICS categories including:

<table>
<thead>
<tr>
<th>NAICS CATEGORIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>321992 – pre-fabricated wood buildings and structures</td>
</tr>
<tr>
<td>332311 – pre-fabricated steel buildings and components</td>
</tr>
<tr>
<td>236220 – commercial building construction</td>
</tr>
<tr>
<td>531120 – commercial building rental or leasing</td>
</tr>
</tbody>
</table>
In general, relocatable buildings, if properly maintained and operated, have useful lives comparable to any other building type. Capital improvements, such as HVAC replacement and roof replacement, are frequently made to these units, which can extend their useful lives for several additional years.

A typical relocatable building will be moved an average of seven times over its life. Again, this varies based on the size and type of the unit. For example, a smaller building made up of 1 or 2 modules may move 12 to 15 times over its life. Construction site offices are good examples of this. Larger complexes, on the other hand, may only move three to five times over their life.

Eighteen companies provided data on the average age of a unit in their lease fleet, with a mean (average) of 11.1 years and a median of 10 years.

**AVERAGE LEASE AND SALES TO ORIGINAL COST RATIO:**

Our findings indicate that in order to recoup the initial capital investment in a unit, a fleet owner typically needs to have the unit on lease for about 44 months. The average lease term per customer is 24-28 months. Once the initial investment is recouped, it is not uncommon for a fleet owner to continue leasing the unit to recover the investment a second time, and finally sell the unit (on average after 7-10 years) at an average sales price to original cost ratio ranging from “85 to 105%” of the original investment, as reported for year-end 2016. This figure was down from 121% for year-end 2015, indicating that existing relocatable buildings, despite a still uncertain economy, are holding their value well.

**AVERAGE SALES PRICE TO ORIGINAL COST RATIO OF 105% FOR YEAR END 2016**

![Sources of revenue by market](chart1.png)

- **Construction Site Offices:** 32.5%
- **General Offices:** 24.4%
- **Healthcare:** 2.1%
- **Retail:** 1.8%
- **Other (workforce housing, institutional, industrial):** 12.7%
- **Education:** 50% (down from 55%)
- **Services (set up and maintenance):** 20% (up from 17%)
- **Lease of new & used units:** 10%
- **Unit sales:** 20%
- **Other (ramps, stairs, etc.):** 50% (down from 55%)

![Sources of revenue by product or service](chart2.png)

- **Lease of new & used units:** 10%
- **Unit sales:** 20% (up from 17%)
- **Services (set up and maintenance):** 20%
- **Other (ramps, stairs, etc.):** 50% (down from 55%)
DEPRECIATION:
When asked about depreciation and residual values of the lease fleet, responses varied based on condition and capital improvements to the fleet, market use of the fleet, and the composition of the types of units in the lease fleet (construction offices, classrooms, etc.). A majority of the units in the industry lease fleet are depreciated over a 20-year period with a 50% residual value.

The economic life (different than depreciable life) of a leased relocatable building is determined by comparing the total cost of maintaining the asset with the income producing capacity over its useful life. Cost includes the initial manufactured cost plus all expenditures for items such as maintenance and taxes incurred during its life. Income includes lease revenue during the building’s useful life and sale value upon disposition. Residual value is understood to be the anticipated “value” of the building at the end of the lease.

The mean annual depreciation has ranged between 5% – 6% for the last several years.

UTILIZATION:
Industry utilization is defined two ways:

- Dividing the total number of units on lease by the total number of units available to be leased.
- Dividing the cost of the units on rent by the total cost of the equipment available.

For purposes of this report, MBI calculates utilization by number of units on lease divided by total number of units on a given date. Utilization data in the chart below is based on information provided by Gordon Brothers.

<table>
<thead>
<tr>
<th>12/31/2016</th>
<th>SINGLEWIDES</th>
<th>COMPLEXES</th>
<th>CLASSROOMS</th>
<th>CUMULATIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>71.7%</td>
<td>73%</td>
<td>55.3%</td>
<td>70.8%</td>
</tr>
</tbody>
</table>

The overall number of units in the fleet as reported by these 5 companies decreased by 2,404 units or 1.7%. This overall decrease resulted from a decline in complexes in company fleet totaling 3,654 units. Slight increases in singlewides and classrooms offset the total fleet decrease for these companies. See regional analysis for a breakdown of utilization by region.

Industry data obtained directly by MBI from 24 companies not included in the data above show an overall utilization rate at December 31, 2016 of 71.7%, consistent with the overall rate above.
MBI REPRESENTS ABOUT 50 COMPANIES BASED IN CANADA, INCLUDING 21 MANUFACTURERS OF MODULAR STRUCTURES. Several of these members have global operations and are among the largest companies in the industry. However, the Canadian relocatable building market is different than the U.S. market in some respects. The Canadian market is heavily influenced by the oil, gas, mining, and other resource extraction industries. For example, many companies, particularly in Western Canada have a fleet of “drill camps,” which are heavy duty skid-mounted units designed to house workers in remote locations. These units are built for ease of transportation and installation. These units lack the “permanency” of larger camp lodging facilities, which are often multi-story facilities and remain on site for several years.

Some companies operate more permanent open camps which, practically speaking, are similar to hotels. The revenue generated from the construction of these camp facilities for a customer has been captured in MBI’s Permanent Modular Construction report (released later this year). Rental revenue from company-owned open camps have not been captured in this report. It should be noted however, that revenue from that source is significant and is in excess of $1 billion annually. The on-going leasing revenue for existing relocatable facilities such as drill camps, as well as all other relocatable building markets have been incorporated in this report.

Another difference in the Canadian relocatable market is the company business model itself. In the U.S. the largest fleet owners typically specialize in that space and generate a majority of their revenue from the sale and lease of relocatable buildings and auxiliary products such as stairs and ramps.

However, in Canada some of the largest fleet operators have a more diverse revenue stream. For example, large fleet owners are also primarily manufacturers as well. This practice is less common in the U.S.

For our analysis in Canada, the regional data from Gordon Brothers is limited, but supplemented by data publicly available from SEDAR. In all we obtained data from 7 Canadian companies with a total fleet of 16,290 units. However, not all of this data was separated by Provinces/Territories. Additionally, many of these companies generated revenue outside of Canada.

OVERALL

MBI obtained data from seven Canadian companies with a combined lease fleet of 16,290 units, including the data from Gordon Brothers. Overall utilization at 12/31/16 was 61.2% down from 68.3% utilization rate for year-end 2015.

Many of these companies engaged in leasing of relocatable buildings also generate income from camps and catering businesses, which are not included in his data, but represent a significant amount of revenue.
MBI obtained data on about 5,000 relocatable building units in Western Canada from Gordon Brothers, showing an overall utilization rate of 52.8%. This data is made up primarily of single wide units.

This region has experienced a prolonged economic downturn due to lower oil prices and delays in capital projects from large oil and gas companies. This region was dominated by companies building lodging facilities for remote workforce housing as well as drill camps and other temporary facilities in conjunction with this market. The lower oil prices caused many companies to lay off workers, reducing the need for accommodations. This in turn put downward pressure on the housing market and the Alberta economy has cooled as a result.

On a positive note, the forecast for new construction in the multi-family market, particularly in British Columbia, is a growth opportunity that many of these same modular companies must explore.

MBI obtained data on about 5,000 relocatable building units in Eastern Canada from Gordon Brothers showing an overall utilization rate of 76.5%. This data is made up primarily of single wide units.

The growth markets and opportunities in Eastern Canada are somewhat more diverse than in Western Canada. New construction starts will benefit relocatable building companies with construction site offices and complexes that can be used for swing space during construction activity.
This data varied by region with some areas experiencing higher utilization rates for single-wides, while others fared better with educational units. Utilization by region and by product segmentation can be found below. Unless noted, regional data was obtained from Gordon Brothers does not include publicly available data used earlier.

Nearly half of the U.S. relocatable buildings market is generated from the sale and lease of relocatable classrooms and construction site offices. It is not uncommon in the U.S. for a company to have virtually all of its lease fleet concentrated in one or both of these markets.

While the average age of relocatable classrooms owned by school systems varies, with many facilities exceeding twenty years, the average age of classrooms owned and leased by the industry is generally about ten years. Classrooms constructed to newer building codes are generally more energy efficient and durable than older units that have been relocated multiple times.

One of the biggest challenges with relocatable buildings is the lack of understanding from local code officials on how to treat a building that has been relocated to their jurisdiction. MBI has developed a “Guide to Code Compliance for Relocatable Buildings,” a summary of which can be found on page 46.
**REGION 1: NORTHEAST**


**Total number of singlewides at YE 2016:** 5,709, up 3.14% from prior year.

**Utilization of singlewides at 12/31/16:** 84.15%, up from 80.96% revised utilization rate.

**Total number of units in complexes:** 2,701, down 2.46% from the prior year.

**Utilization of complexes at 12/31/16:** 74.79%, up slightly from 74.11% from the prior year.

**Total classroom units:** 675, about the same as the prior year.

**Utilization of classrooms:** 46.52%, down from 51.1% in the prior year.

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**REGION 2: MID-ATLANTIC**

- Virginia, West Virginia, Pennsylvania, Maryland, District of Columbia, Delaware, and New Jersey

**Total number of singlewides at YE 2016:** 8,433, up 4.12% from prior year.

**Utilization of singlewides at 12/31/16:** 70.34%, equal to prior year utilization rate.

**Total number of units in complexes:** 4,964, down 9.55% from the prior year.

**Utilization of complexes at 12/31/16:** 75.73%, up from 68.64% from the prior year.

**Total classroom units:** 1,734, down 5.4% from the prior year.

**Utilization of classrooms:** 59.23%, down from 61.87% in the prior year.
**REGION 3: SOUTHEAST**

Total number of singlewides at YE 2016: 13,109, down slightly from the prior year.

Utilization of singlewides at 12/31/16: 69.99%, up from 66.25% in the prior year utilization rate.

Total number of units in complexes: 11,729, down 19.54% from the prior year.

Utilization of complexes at 12/31/16: 66.86%, up from 59.62% from the prior year.

Total classroom units: 6,078, up significantly from the 4,925 units reported in the prior year.

Utilization of classrooms: 48.93% compared to 53.79% in the prior year (down as a result of total classroom units).

**REGION 4: SOUTH CENTRAL**

Total number of singlewides at YE 2016: 11,935, up 2.8% from prior year.

Utilization of singlewides at 12/31/16: 71.17%, down slightly from 72.13% in the prior year.

Total number of units in complexes: 11,608, down 1.23% from the prior year.

Utilization of complexes at 12/31/16: 75.73%, up from 68.64% from the prior year.

Total classroom units: 1,927, down 0.41% from the prior year.

Utilization of classrooms: 75.61%, down from 77.16% in the prior year.
REGION 5: CENTRAL
Ohio, Kentucky, Indiana, Michigan, Illinois, Wisconsin, Minnesota, Iowa, and Missouri

Total number of singlewides at YE 2016:
8,940, down 1.44% from prior year.

Utilization of singlewides at 12/31/16:
74.30%, up from 73.46% in the prior year.

Total number of units in complexes:
5,040, down 5.30% from the prior year.

Utilization of complexes at 12/31/16:
74.92%, up from 73.26% from the prior year.

Total classroom units:
936, down 4.10% from the prior year.

Utilization of classrooms:
63.57%, down from 65.57% in the prior year.

REGION 6: WESTERN
California, Arizona, Nevada, and Utah

Total number of singlewides at YE 2016:
11,385, down 1.75% from prior year.

Utilization of singlewides at 12/31/16:
67.82%, up from 62.98% in the prior year.

Total number of units in complexes:
8,774, down 2.69% from the prior year.

Utilization of complexes at 12/31/16:
73.92%, up from 70.34% from the prior year.

Total classroom units:
4,681, down 9.12% from the prior year.

Utilization of classrooms:
51.34%, up from 45.21% in the prior year.

California is the largest market for relocatable classrooms with the state itself owning over 80,000 units. This utilization figure does not include data MBI obtained directly from two other California-based fleet owners active in the education market. Those two companies collectively own more than the total represented from the Gordon Brothers data. Including their data in this regional analysis increases the overall number of education units in the region to over 25,000 and the utilization rate to approximately 72%.
REGION 7: NORTHWEST

Oregon, Washington, Idaho, Alaska, and Hawaii

Total number of singlewides at YE 2016: 84,073, up 2.75% from prior year.
Utilization of singlewides at 12/31/16: 77.17%, up from 72.75% in the prior year.
Total number of units in complexes: 1,222, down 1.85% from the prior year.
Utilization of complexes at 12/31/16: 84.86%, up from 81.29% from the prior year.
Total classroom units: = 1,151, up 3.42% from the prior year.
Utilization of classrooms: 86.75%, up from 82.88% in the prior year.

REGION 8: NORTH CENTRAL

Colorado, Kansas, Nebraska, South Dakota, North Dakota, Wyoming, and Montana

Total number of singlewides at YE 2016: 3,066, up 19.39% from prior year.
Utilization of singlewides at 12/31/16: 73.84%, up from 68.22% in the prior year.
Total number of units in complexes: 1,827 up, 32.87% from the prior year.
Utilization of complexes at 12/31/16: 77.83%, up from 67.35% from the prior year.
Total classroom units: 267, up 8.67% from the prior year.
Utilization of classrooms: 82.02% up from 77.96% in the prior year.
All newly constructed relocatable buildings must be constructed in accordance with the building codes that are in effect at the time of the building’s construction. These buildings are constructed off-site and many elements are concealed when the building arrives to the site (closed construction).

As such, most states (35) have a state-wide administrative program in place to determine if the building itself was constructed in accordance with all applicable codes. The terminology varies within state programs with many referring to these buildings as “industrialized buildings”, or even “manufactured buildings.” The latter term is not generally preferred as it tends to imply that these buildings are constructed to the same federal HUD code as manufactured housing products, which is not the case.

These state programs require manufacturers of relocatable buildings to be approved with the state agency, have a quality assurance program approved, and submit regular reports. Additionally, each floor plan the manufacturer intends to build must be reviewed and approved by a licensed third-party design professional in the state. These professionals are sometimes referred to as compliance assurance agencies (CAA) or third-party inspection agencies (TPIA).

Once the manufacturer and plan is approved, every manufactured section or module of an industrialized building shall be marked with a label supplied by the TPIA that includes the name and address of the compliance assurance agency and the certification label number.

The relocatable building will also have a manufacturer’s data plate that is permanently attached on or adjacent to the electrical panel posted in the location as noted on the drawings, and includes information such as:

- Occupancy group
- Manufacturer’s name and address
- Date of manufacture
- Serial number of module
- Design roof live load, design floor live load, snow load, wind and seismic design
- Approved Quality assurance agency or approved inspection agency
- Codes, and standards of construction
- Envelope thermal resistance values
- Electrical service size
- Fuel burning equipment and size
- Special limitations if any

Following this process, the building is ready to be permitted and placed on its first location and is considered approved or “registered” in the state. Registered buildings should be accepted in all localities as meeting the requirements of the codes for the building itself. The label affixed by the third party is the indication for the local building code official that the unit does in fact comply with codes. The local, therefore, generally has no jurisdiction over “what is inside the box.” However, local requirements affecting buildings, such as local land-use and zoning, local fire zones, site development, building setback, side and rear yard requirements, property line requirements, subdivision regulations, are within the scope of the local authority.
EXISTING RELOCATABLE BUILDINGS

Unique to relocatable buildings is that they are designed and constructed with the explicit purpose of being relocated and used multiple times possibly at multiple locations, including in other states.

Once relocated from its original site, the building is now considered an “existing building” (per IBC 2015, one for which a legal building permit has been issued). Prior to 2015, Chapter 34 of the IBC contained compliance information for existing buildings. Beginning with the 2015 IBC, Chapter 34 has been removed in its entirety and replaced with a “pointer” to the International Existing Building Code or IEBC (IBC 2015 Section 101.4.7).

In Chapter 13 of the 2015 IEBC, “Relocated or Moved Buildings,” Section 1301.1 Scope states that “this chapter provides requirements for relocated or moved structures, including relocatable buildings as defined in Chapter 2”. Those requirements address various life safety issues such as the wind loads, seismic loads, and snow loads. Any existing relocatable building moved into a new jurisdiction must meet these load conditions. The local code official can find this information from the manufacturer’s data plate affixed to the building.

Aside from the specific site and zoning issues, a local building code official needs only to locate the third-party label and the manufacturer’s data plate on the relocatable building to determine compliance. If the building is missing either the label or the data-plate, the building is subject to approval by the local code official.

Relocatable Building defined (2015 IEBC) – a partially or completely assembled building constructed and designed to be reused multiple times and transported to different building sites.

RELOCATABLE BUILDING SECTOR SUMMARY

With approximately $6 billion in building assets, the relocatable building industry showed its resiliency in 2016 with overall utilization up to 70.8%, from 67.75% at year-end 2015. The sales price to original cost ratio remained above 1.0x (unit sold for over 100% of original cost) at 1.05x.

Revenue mix was generated from roughly the same market segments with over half the industry revenues coming from relocatable classrooms and construction site offices.

While utilization is up, nearly 30% of industry owned assets were not generating revenue at year end 2016. As such construction of new fleet units is not anticipated in the near future. Additionally, more stringent code requirements will add to the cost of newly constructed units, without a corresponding increase in base rental rates. This will encourage owners to spend more on renovations and repairs to extend the useful lives of existing assets, and to continue to challenge regulations that unduly limit revenue generation on their assets.

Customers in all these markets will continue to utilize relocatable buildings for their speed, flexibility, practicality, and cost.
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WWW.OFFSITECONSTRUCTIONEXPO.COM

September 29, 2017
University of British Columbia
Vancouver, BC

October 26, 2017
Pennsylvania Convention Center
Philadelphia, PA

November 15, 2017
Hyatt Regency Dallas
Dallas, TX

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