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 twenty 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.

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

- **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 Mechanical, Electrical, Plumbing (MEP), fixtures and interior finishes in less time, with less waste and higher quality control compared to projects utilizing only traditional site construction.

- **Relocatable Buildings (RB)**
  - A relocatable building is a partially or completely assembled building that complies with applicable codes and state regulations, and is constructed in a building manufacturing facility using a modular construction process. Relocatable modular buildings are designed to be reused or repurposed multiple times and transported to different sites.

Unlike the federally regulated HUD-Code manufactured housing industry, the modular construction industry is regulated primarily at the state and local levels by building code officials and agency administrators. As with site built structures, all modularly-constructed facilities must meet the local codes where the building is to be sited. 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.

Parallels can be drawn with the automobile industry. Materials and components are delivered to a factory where the assembly of the product occurs. The product is then shipped to another location (distributor, end user). It sounds incredulous to think that it would be efficient for the customer to order all the parts and components of an automobile, have them delivered to his driveway, have the parts subject to inclement weather, and assemble his automobile on site. And yet we construct buildings in that manner every day. The automobile industry figured out a better process 100 years ago!

The term “modular” literally means – “Designed with standardized units or dimensions for easy assembly and repair or flexible arrangement and use”. When used in construction, the modular process is utilized for numerous applications and projects including submarines and cruise ships, heavy industrial plants, even nuclear facilities.

Modular construction applied to the building industry can be further segmented into commercial or residential markets. MBI serves the commercial modular construction markets. For information about the residential modular industry, visit [www.modularhousing.com](http://www.modularhousing.com).

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.

An important but subtle difference for this report is that permanent modular construction (PMC) refers to three-dimensional (or volumetric) building modules that are prefabricated offsite and transported to the site to make up portions of, or the entire building, rather than prefabricated mechanical systems or wall assemblies.
Countless industries regularly use permanent modular construction, including schools, banks, restaurants, hospitals, medical clinics, day care centers and correctional facilities – just to name a few. The industries that utilize our services are numerous (as measured by the North American Industry Classification System (NAICS)), but the most common categories include:

236116 – New Multi-family Housing Construction
236220 – Commercial and Institutional Building Construction

The primary benefits of permanent modular construction include:

- **GREENER** - Reduced environmental impact – less site damage, less material exposure and less waste in landfill.
- **FASTER** - Streamlined construction process (in many cases, occupancy occurs 50 percent faster than with conventional construction).
- **SAFER** - According to McGraw Hill's *Safety Management in the Construction Industry SmartMarket Report*, “Firms using prefabrication... have significantly higher adoption levels of nearly all the safety practices measured in the survey, 73% of prefabrication/modularization users report having a fully inclusive and widely observed safety program, compared with 48% of those not using prefabrication.”

Commercial modular buildings are non-residential structures, completed 60 to 90 percent offsite in a controlled environment, then transported and assembled at the final building site. This can comprise the entire building or be components or subassemblies of larger structures. In many cases, modular contractors work with traditional general contractors to leverage the resources and advantages of each type of construction.

The term “modular” describes a construction method or process where individual modules stand alone or are assembled together to make up larger structures. Unlike relocatable buildings, these structures are intended to remain in one location for the duration of their useful life -- thus, permanent.

Permanent modular buildings may be wood frame, steel, and/or concrete and can have as many stories as building codes allow.

Primarily, four stages make up a modular construction project:

1. Design approval by the end user and any regulating authorities;
2. Assembly of module components in a controlled environment;
3. Transportation of modules to a final destination;
4. Erection of modular units to form a finished building.

Modular contractors manufacture buildings (or contract to have buildings manufactured) at offsite locations. Responding to customer requests, they typically operate as general contractors on projects, coordinating the delivery, installation, site work and finish of the building. Construction primarily occurs indoors, away from harsh weather conditions, preventing damage to building materials and allowing builders to work in comfortable conditions.

Unique to modular construction, while modules are being assembled in a factory, site work is occurring at the same time, or in some cases, prior to construction. This concurrent construction expedites the overall construction schedule and building occupancy, reducing labor costs as well as financing and supervision costs. Saving even more time and money, nearly all design and engineering disciplines are part of the manufacturing process.

Also unique to modular construction is the ability to simultaneously construct a building’s floors, walls, ceilings and rafters. During site-built construction, walls cannot be set until floors are in position, and ceilings and rafters cannot be added until walls are erected. On the other hand, with modular methods of construction, walls, floors, ceilings and rafters are all built at the same time, and then brought together in the same factory to form a building. This process often allows modular construction times of half that of conventional, stick-built construction.

These practical time and money saving alternatives to site-built construction effectively meet the specialized needs of diverse businesses. Customers served by modular construction include federal, state, provincial, and local governments; school boards, corporations, non-profit organizations, retail establishments, healthcare providers, as well as individuals, partnerships, and sole proprietors. Other uses include medical facilities, airport facilities, military installations, restaurants, churches and remote telecommunications stations.

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Pantheon Construction: Safety Management in the Construction Industry, SmartMarket Report

Barrie School
Completion: 121 days

**Food for thought:**

“The method of constructing these buildings helps conserve materials and resources, and greater precision in construction can allow for a tighter, more efficient envelope.”

It is of key importance to bring the modular contractor/manufacturer into the building process as early as possible as part of the team. As such, the Design-Bid-Build process is a less than desirable approach. Projects utilizing a Design-Build approach or Integrated Project Delivery (IPD) allow the modular company to bring the industry advantages to the table earlier in the conversation.

In many cases, a modular manufacturer is a sub-contractor to a traditional general contractor on a project. However in some cases, a modular manufacturer may also be the general contractor working directly with the end user. These manufacturers are often referred to as direct or integrated manufacturers.

**Typical traditional project schedule:**

**Typical modular project schedule:**

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**DESIGN CONSIDERATIONS**

It is important to note that if a project is to utilize modular construction successfully, the process begins at the design phase. There are some characteristics to modular construction that should be considered when designing a project:

- Three-dimensional modules have widths that are typically nominal 8-, 10-, 12-, 14-, and 16-feet with 12- and 14-feet being the most common. Framing dimensions are typically 2-inches less than nominal size.

- Module lengths are up to 70-feet, usually in 2-feet increments.

- Module heights vary from approximately 11-feet 6-inches to 13-feet, not including the height of the unit’s transport trailer or frame.

- Wood frame construction is the most common type of construction, however manufacturers also build with steel and concrete and can meet the requirements for Type-I, -II, and -III construction.

- Multistory modular buildings can be built up to the maximum stories allowed by code. A majority of modular buildings are 1-3 stories, but a rapidly growing trend is towards 4-8 story facilities. A handful of projects have exceeded 15 stories in the U.K. and U.S.

- Restroom areas should be designed so that a module “marriage or mate line” does not split the space.

- Multiple roof framing styles are available. Some can be completed in the factory, and some may require the installation of site-installed trusses.

- Modular buildings can be configured using modules of various lengths and widths.
Permanent modular buildings are considered real property, built to the same building codes and requirements as site-built structures, and are depreciated in a similar manner. As such, the markets for permanent modular construction are similar to the markets for site-built contractors, with few exceptions. The top five markets for PMC in North America are:

- **Education**
- **Multi-Family**
- **Healthcare**
- “Office & Administration”

From single classrooms to complete campuses, modular construction offers public, private, and charter schools what other construction methods cannot: accelerated project timelines, more economical pricing, and less disruption. Permanent modular schools are indistinguishable from other schools and can be constructed to any architectural and customer specifications. MBI members design and build schools of all types and sizes using traditional building materials such as wood, steel and concrete. Virtually any size permanent school can be built, installed and ready for occupancy in as little as 90 days. Perhaps most importantly, using offsite technology, open construction sites are eliminated while school is in session. Students are safer, and teachers can instruct with less disruption.

Modular construction offers the ability to provide condominiums, apartments, hotels, student dorms, and workforce accommodations in about half the time as traditional, site-built construction methods. More and more cities and countries are turning to modular construction methods to deliver much-needed housing that is more cost-effective and more eco-friendly due to reduced waste and in-factory processes.

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**MARKETS SERVED**

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**Education:**
- Muhlenberg Dormitory
- Completion: 174 days

**Multi-family:**
- Stack Apartments
- Completion: 272 days
Many hospital and healthcare facility contractors are turning to modular, primarily for building components such as bathroom pods and headwalls. However, entire hospitals have been constructed utilizing modular construction techniques. Modular construction offers quiet, safe and clean applications for medical, surgical, clinical and dental use. The insight MBI contractors have from designing and building thousands of medical facilities has resulted in satisfied healthcare professionals the world over. If an organization or community needs a new rehabilitation clinic, emergency room, operating room, hospital extension, laboratory, diagnostic center or other medical facility, remember that modular construction can be used for custom-built facilities with the tightest budgets while maintaining strict medical and aesthetic specifications.

Permanent modular buildings serve as corporate headquarters, satellite bureaus, institutional and administrative buildings, and offices for all business types. Modern single- and multi-story buildings can be configured in a number of ways to include independent offices, conference rooms, elegant lobbies, kitchens, restrooms and large open spaces for cubicles or other partition systems. MBI members have architectural and engineering designs for workspace planning, storm water management, landscaping, parking, and zoned heating and air conditioning. If it is time to capitalize on company growth, modular construction offers a fast, economical approach.
Simply put, quicker occupancy equals quicker return on investment. Modular construction is accelerated construction. Why is this so important to banks, restaurants, convenience stores, child care centers and other retail establishments? Because earlier occupancy means a customer generates revenue faster. In fact, it’s not uncommon for many modular buildings to be up and running in as little as 24 hours—an important consideration for retailers of all types. Typical retail applications include restaurants and diners, banks, golf pro shops, convenience stores, gas stations, car washes, and concession stands, to name a few. MBI contractors provide a full array of services including site, mechanical and electrical work. Customers can accommodate their emerging business with modular buildings customized to their financial needs, space requirements and deadlines.

MARKETS SERVED

COMMERCIAL (RETAIL/HOSPITALITY)

Commercial Retail: Micro Drive Thru
Completion: 70 days

Commercial Retail: Local Community Bank
Completion: 156 days
The sky™ High Performance Classroom Building utilizes a dedicated air handler for each classroom with individual controls. As an alternate, a Variable Refrigerant Flow system is available with a centralized array of split-system heat pumps and single or multiple fan coils in each classroom with each having individual controls. A programmable thermostat is utilized to control the air handler, as well as temperature, humidity, occupancy, and CO2 sensors to maximize the system efficiency and occupant comfort. Operable windows are provided to allow for natural cooling and circulation when desired.

The building utilizes a mechanical ventilation system to provide fresh air in excess of the volumes required by both the California Title 24 Regulations (Part 6) and the ASHRAE 62.1 standards. High MERV rated filters are used in the air handler with either a mechanical or digital notification provided to alert the user of a dirty filter to ensure that air quality is maximized. Low and No-VOC products, materials, paints and coatings are used throughout the building. Non-absorbent materials and overhangs or canopies are used adjacent to exterior doorways to reduce the potential for moisture transfer into the building. Temperature and humidity control systems are designed and provided to be in accordance with the ASHRAE 55 standards. While the building is being constructed in the factory all materials and modules are protected by canopies and enclosures. On the project site a building flush-out is performed prior to occupancy.

The sky™ High Performance Classroom Building utilizes a variety of daylight harvesting systems to provide a well-lit and comfortable learning environment while reducing or eliminating electric light usage during the normal classroom operational hours. The optimal placement of the building will result in large north facing glazed openings provided at view level with additional clerestory windows provided above view level and offset towards the center of the classroom to provide optimal light distribution.

Smaller windows are provided above view level at the south facing wall to allow additional natural light into the space while minimizing the associated heat gain and direct sunlight entry. Tubular skylights with dimming controls are provided where the clerestory does not occur in order to ensure natural light is available throughout the classroom. A customizable control system ensures that electrical lighting is not used when adequate natural lighting is available.

Mechanical equipment is utilized which features noise dampers, silencers and vibration controls to significantly reduce the contribution to the background noise levels from the space conditioning system. STC rated wall and roof assemblies are used to isolate the classroom from the exterior background noise and STC rated window and door assemblies are available for use on project sites which feature abnormally high levels of sound exposure. Lay-in ceiling panels with a high Noise Reduction Coefficient are used where clerestory windows do not occur. Tectum panels with a high Noise Reduction Coefficient are utilized in the clerestory areas to provide a unique architectural treatment while controlling reverberation. The result is a learning environment with background noise levels below 35 dBA and reverberation times of less than 0.6 seconds.

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Art's Way Scientific was selected by the Whiting-Turner Contracting Company to provide a 21,324 SF facility as part of a major campus project teamed with other architects and design firms. This facility consists of over 90% vivarium space with 24,000 cages. It also includes office, MEP, shower, and breakroom space. The building had to meet a variety of codes and standards including ADA, Cal-Green, Campus Standards and The Guide for the Care and Use of Laboratory Animals. Animal space is achieved with a seamless, anti-bacterial fiberglass reinforced epoxy coating system, Sika epoxy flooring and FRP doors. Staff areas include carpet, acoustical ceilings, wood doors and painted gypsum walls. Aluminum rail protects the facility from equipment traffic. A storefront entry, casement windows and a stained vertical grain cedar slat rain screen allows this facility to blend into the existing campus as it achieves the accreditation of an ABSL-2 facility and offers a pleasing, discreet appearance.

After a number of cost and schedule analyses, it was determined that modular construction, in lieu of conventional methods, would not only cut costs by 10% but also the schedule by 5 months. The design team considered all elements of value engineering such as rooftop HVAC entry with branching through common corridors. The design includes low-flow fixtures and recyclable caging, eliminating a cage wash which achieved an estimated water savings greater than 1 million gallons and $40,000 in energy costs annually. Factory pre-commissioning and testing contributed to reduced costs on site. LED exam lighting is used in the procedure rooms. Two mobilizations of delivery minimized disruption, allowing business as usual on campus. By going modular, the owner was able to continue their ongoing research while addressing their expanding need for animal space in a quick, cost efficient way.

The four-story 240 room extended stay hotel was designed to meet the growing demand for lodging in the Williston, ND area. The facility services the Bakken Shale region with a state-of-the-art full-service kitchen and dining facility, game room, fitness center and meeting rooms. Featuring two separate wings with common areas in the center, the project consisted of 128 modules accounting for 99,700 square feet of space in an “L” shaped configuration. Because it is an extended stay hotel, the rooms were generously sized with lots of amenities. Interior finishes were clean and modern and provided for maximum efficiency in the space. The exterior was finished with two different colors and types of siding to provide visual interest. The entrance area was enhanced with natural stone siding. Earth tone colors were chosen to blend with the natural surroundings.

The project faced the challenge of construction during the harsh North Dakota winter months coupled with limited local resources of labor and materials. These challenges, along with the desire for speed, made modular construction a logical choice. Given the fact the occupants would primarily be oil field workers, sustainable materials were used throughout the project. Examples include commercial carpet, heavy duty doors and hardware, and quartz countertops. Energy efficiency and green building were also considerations. The units also had to be designed to be comfortable during the harsh winter months. Energy saving features like heavy insulation, water saving Moen fixtures, and Low-E argon filled windows added to the energy saving and green aspects of the building.

Offsite construction had a significant impact on costs given the geographic location of the project. However, the most significant benefit to the customer was the time savings which led to reduced construction costs and faster revenues. With the severe lack of housing in Williston, the hotel would be immediately filled once completed, so time was of the essence. The 128 modules were built in Champion Commercial Structures’s Weiser, ID facility in less than 40 days. Modular construction allowed the units to be delivered and set during the winter months where site construction would not have been possible. By partnering with fellow MBI member M Space Holdings, Champion was able to deliver a quality building to the customer on a very tight project schedule. The entire project, nearly 100,000 square feet, was completed in just 277 days!
The U.S. Census Bureau reports monthly the value of construction put in place for residential and commercial, and for public and private projects. Seasonally adjusted annual data through December 2013 indicated that the total U.S. construction put in place was about $930 billion annualized, $357 billion in residential and $573 billion in non-residential.

The non-residential category can be further delineated into “buildings” and “non-buildings” categories such as power, highway and street, and water supply. Building categories that align with industry key markets are: lodging, office, commercial, healthcare, educational and religious. These categories totaled $231.3 billion for 2013.

The permanent modular construction market in the U.S. is roughly $3.0 billion and therefore is 1.3 percent of construction put in place in these markets.

Seasonally adjusted annual U.S. market construction put in place through December 2013 (non residential – key modular markets)

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<th>Market</th>
<th>$ Billion</th>
<th>% Increase/Decrease from 2012</th>
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<tr>
<td>Lodging</td>
<td>16.7</td>
<td>31.0%</td>
</tr>
<tr>
<td>Office</td>
<td>41.3</td>
<td>6.0%</td>
</tr>
<tr>
<td>Commercial</td>
<td>54.7</td>
<td>19.7%</td>
</tr>
<tr>
<td>Healthcare</td>
<td>40.3</td>
<td>-1.9%</td>
</tr>
<tr>
<td>Education</td>
<td>75.1</td>
<td>-8.2%</td>
</tr>
<tr>
<td>Religious</td>
<td>3.2</td>
<td>-7.2%</td>
</tr>
<tr>
<td>Total</td>
<td>231.3</td>
<td>3.5%</td>
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</tbody>
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Modular manufacturers are located throughout North America, with larger clusters of manufacturers in Pennsylvania, Georgia, Texas, Indiana, California and Alberta, Canada. Most manufacturers in North America are single location operations and can competitively transport units within a 500 mile radius of their plant. Peak employee size varied significantly, obviously impacted by market and geography as well as the physical size of the plant. While not necessarily an indication of actual activity, the average manufacturer is approved to build in 20 states.

In general, manufacturers average 170 workers during their peak production. Larger companies with multiple locations employ as many as 4,000 workers, while smaller plants employ between 60-70.

MBI obtained data from a dozen manufacturers in various regions across North America. The typical modular manufacturer produced about 300,212 square feet in 2013, producing an average of 372 “floors” or “modules”. In 2012, the average manufacturer reported production of 250,000 square feet and an average of 290 modules (based on an average module size of 680 sf). It should be noted that the manufacturers reporting in 2012 were not the same sample group in 2013.

Several of the manufacturers reporting in 2013 indicted that square footage production dropped by ten to twelve percent. This drop could be attributed to multiple factors including the uncertain economy. Other factors could include manufacturers working on more complex, customized, and time consuming projects.

Of the companies reporting an increase in production in 2013, the increase was attributable almost exclusively to the workforce housing and accommodations market.

In 2013 manufacturers also seemed to concentrate on fewer markets, more so than in past years. Nearly all manufacturers surveyed generated 50% or more of their revenues from a single market, with many reporting 80+% concentration in one market.

In the U.S. the educational facilities market is still strong with respondents indicating that 26% of production came from this market. Twenty-one percent of the reported floors produced was for the multi-family market, while approximately twenty-two percent of production was for the retail/commercial market. Nearly twenty percent of reported production in 2013 came from the industrial market (which includes workforce housing) while seven percent came from the healthcare market. “Other” markets made up the balance.

In Western Canada, the dominant market continues to be industrial/workforce housing accommodations, driven by oil-sands development in Alberta, liquefied natural gas (LNG) development in British Columbia and hydro-electric projects in Manitoba.

Depending on the level of customization required by the owner and architect, most modules leave the factory 60-90 percent complete, with wiring, plumbing, structural and mechanical systems inspected and approved before arriving at the site.
We predict that in the upcoming years, modularization and prefabrication will play an increasingly vital role in improving the productivity of the entire construction value chain.

--FMI 2013 U.S. Markets Construction Overview

In many countries across the world, the government is leading the charge towards greater construction industry productivity and efficiency. In the U.K., for example, the Cameron government has created a BIM Task Group and implemented a strategy to reduce both capital costs and carbon dioxide creation from the construction and operation of buildings by 20%. By 2016, model-based BIM will be mandatory on all publicly funded projects.

In the U.S. there are many initiatives and agency-wide programs being implemented, as well as a variety of programs aimed at improving the energy efficiency and performance of buildings. But the amount of resource inefficiency and waste have a significant impact on the industry and the economy.

The Architectural Billings Index (ABI) is a leading economic indicator of construction activity and shows an approximate 9 - 12 month lag time between architectural billings and construction spending, with a score above “50” indicating an increase in billings. The ABI for December 2013 was 48.5, down from 49.8 in November. In the western states, the ABI was 53.2, and 51.2 in the south. The overall declines were in the Midwest (47.0) and the Northeast (42.8).

School Population Increase in K-12 – Public elementary enrollment is projected to continue a pattern of annual increases through 2016. Public secondary school enrollment in 2016 is expected to be about 2 percent higher than in 2007.
In addition to established markets such as educational, office, and multi-family projects, modular construction could be a significant breakthrough in the United States in dealing with numerous societal issues. For example, modular construction offers the opportunity for a more efficient process to improve healthcare delivery to veterans, infrastructure support for immigration issues, and addressing chronic homelessness. The U.S. Government spends billions annually and still struggles to deal with these important issues.

Internationally, the potential to export construction processes and products to address large natural disasters or remote housing needs provides any country with an economic benefit (jobs) for their humanitarian support outside their borders. The United States is the largest donor to international humanitarian efforts, contributing nearly $4 billion in 2012 or 29% of all humanitarian assistance by all governments (according to GlobalHumanitarianAssistance.org). Improving the efficiency in which funds are disbursed and how aid is delivered could not only stretch these dollars further, but provide greater economic benefits at home.

Developers, franchisees, and owners seeking greater project predictability and a quicker return on investment are increasingly turning to modular construction for projects such as hotels, apartments, townhouses, and quick service restaurants.

Traditional general contractors facing unpredictable labor markets and shortages see modular construction as a method towards improved project delivery, better worker safety, higher quality control, and increased profitability.

Architects are beginning to realize that with this offsite construction process, a great deal of material waste can be designed out of the process and ultimately diverted from our landfills.

In short, modular construction offers the potential on every project for:

- Shortened construction schedules
- Greater project predictability
- Greater quality control
- Quicker return on investment
- Less material waste
- Safer working conditions
- More resilient and durable structures
National Institute of Building Sciences (NIBS) - Off-Site Construction Council (OSCC)

The National Institute of Building Sciences (NIBS) was authorized by the U.S. Congress in the Housing and Community Development Act of 1974, Public Law 93-383. In establishing the Institute, Congress recognized the need for an organization that could serve as an interface between government and the private sector. The Institute’s public interest mission is to serve the Nation by supporting advances in building science and technology to improve the built environment.

Through the Institute, Congress established a public/private partnership to enable findings on technical, building-related matters to be used effectively to improve government, commerce and industry.

“Off-site construction” is the planning, design, fabrication and assembly of building elements at a location other than their final installed location to support the rapid and efficient construction of a permanent structure. Such building elements may be prefabricated at a different location and transported to the site or prefabricated on the construction site and then transported to their final location. Off-site construction is characterized by an integrated planning and supply chain optimization strategy.

Internationally, prefabrication and off-site fabrication have provided numerous productivity benefits—specifically in the areas of labor, scheduling, cost, quality and safety. In the United States, the National Research Council has identified the expanded use of prefabrication and off-site fabrication as an important method for advancing the competitiveness and productivity of the domestic construction industry over the next 20 years.

The U.S. off-site design and construction industry has made significant advances in implementing processes and materials to build and deliver more sophisticated and complex facility types by virtue of system prefabrication, unitization, modularization and panelization. More and more owners are turning to off-site methods for multi-story wood construction, steel framed structures, healthcare facilities, educational structures and large-scale military projects. As an industry, however, owners, architects, engineers and contractors up until now have lacked an unbiased source for evaluating the applicability and potential benefits for use of such methods, for determining where and when fabrication is appropriate, and for identifying the range of choices inherent in integrating and collaborating with fabricators.

In 2013, the National Institute of Building Sciences established the Off-Site Construction Council (OSCC) to serve as a research, education and outreach center for relevant and current information on off-site design and construction for commercial, institutional and multi-family facilities.

Membership in the OSCC is open to all members of the National Institute of Building Sciences. If you are already a member of the Institute, you may join the OSCC by emailing us at nibs@nibs.org with “JOIN OSCC” in the subject line. Non-members may join the Institute and the Council by completing the online membership application: http://bit.ly/nibs-membership.

For further details on the Council, please contact:
Ryan Colker
Director, Consultative Council/Presidential Advisor
rcolker@nibs.org

Mbi Foundations

The MBI Educational Foundation and the MBI Canadian Foundation were established specifically to provide educational opportunities in the form of training, research, and scholarships to individuals with an interest in commercial modular construction. The foundation began in 2001 with a generous $100,000 gift from Barry & Mary Gossett. Mr. Gossett is an industry veteran, member of the MBI Hall of Fame, recipient of the MBI Outstanding Achievement Award, and esteemed friend to many modular building professionals. Since their beginning, the foundations have trained over 1000 industry professionals, awarded dozens of student scholarships, and spear-headed invaluable industry research.

Partners in Education

The foundations continue to establish partnerships with institutions of higher learning around the world to help educate a rising generation of construction professionals about the benefits of modular buildings. Schools of architecture, engineering, and construction management engage in partnerships ranging from $2500 to $10,000 in support per year. Benefits to the school include scholarships, instructional support, in-kind donations, and travel to World of Modular. Benefits to MBI members include timely research, a unique form of outreach, and recognition as industry leaders.

The Foundation webpages host a resource library full of research, whitepapers and studies about the industry: www.modularfoundation.org

Current partners in Education

- British Columbia Institute of Technology
- Cal Poly Pomona College of Environmental Design
- California College of the Arts
- Catholic University School of Architecture
- Clemson University School of Construction Management
- Pratt Institute School of Architecture
- University of Alberta Hole School of Engineering
- University of Utah Integrated Tech. in Architecture Center
- Virginia Tech School of Architecture & Design
- Western Carolina University
Building Information Modeling (BIM) - Building Information Modeling (BIM) is an intelligent model-based process that provides insight for creating and managing building and infrastructure projects faster, more economically, and with less environmental impact. BIM software typically includes a comprehensive portfolio of solutions for design, visualization, simulation, and collaboration that uses the rich information in the intelligent model to inform better decision-making and break down the barriers to better business. (source: Autodesk)

Building Envelope - The physical separator between the interior and the exterior environments of a building. It serves as the outer shell to help maintain the indoor environment (together with the mechanical conditioning systems) and facilitate its climate control. Building envelope design is a specialized area of architectural and engineering practice that draws from all areas of building science and indoor climate control.

Closed construction - A building, component, assembly, subassembly, or system manufactured in such a manner that all portions cannot be readily inspected at the installation site without disassembly or destruction thereof. (source: Louisiana Industrialized Buildings program)

Compliance Assurance Agency (aka third party inspection agency) - An architect or professional engineer, or an organization, specially qualified by reason of facilities, personnel, experience, and demonstrated reliability, to investigate, test and evaluate modular buildings, to list such buildings complying with standards; to provide adequate follow-up services at the point of manufacture to ensure that production units are in full compliance; and to provide a label as evidence of compliance on each manufactured section or module. (source: Virginia Industrialized Buildings Program)

Component - Uniquely identifiable input, part, piece, assembly or subassembly, system or subsystem, that (1) is required to complete or finish an activity, item, or job, (2) performs a distinctive and necessary function in the operation of a system, or (3) is intended to be included as a part of a finished, packaged, and labeled item. Components are usually removable in one piece and are considered indivisible for a particular purpose or use.

Cross-laminated timber (CLT) - Cross-laminated timber (CLT) is a prefabricated solid engineered wood panel. CLT is made from three or more layers of solid-sawn lumber or structural composite lumber (SCL) that are orthogonally bonded together with structural adhesives to form a solid, straight rectangular-shaped panel. Stacking the layers crosswise increases the structural and dimensional stability of the product. CLT is intended for use in wall, floor and roof applications in residential and non-residential buildings. The panels are available in a range of sizes and can be customized to fit specific needs. (source: American Plywood Association)

Deconstruction - The process of taking a building or structure, or portion thereof, apart with the intent of repurposing, reusing, recycling, or salvaging as many of the materials, products, components, assemblies, or modules as possible.

Erection/Installation /Set - The process of blocking, leveling and anchoring a modular building unit on the building site upon delivery.

Insulating concrete form (ICF) - ICF are basically forms for poured concrete walls, that stay in place as a permanent part of the wall assembly. The forms, made of foam insulation, are either pre-formed interlocking blocks or separate panels connected with plastic ties. The left-in-place forms not only provide a continuous insulation and sound barrier, but also a backing for drywall on the inside, and stucco, lap siding, or brick on the outside. (source: KFA)

Label/Insignia/Seal - Label affixed to a unit by the manufacturer as proof that the building meets all the applicable local code requirements.

Light gauge steel - A cold-rolled steel product, commonly available in the shape of flat sheets, angles, or channels; often used to frame non-structural partitions.

Marriage Wall/Cross Over Connections - The joint between the modules in a complex, commonly called a mateline or modline.

Offsite Construction - The planning, design, fabrication and assembly of building elements at a location other than their final installed location to support the rapid and efficient construction of a permanent structure. Such building elements may be prefabricated at a different location and transported to the site or prefabricated on the construction site and then transported to their final location. Offsite construction is characterized by an integrated planning and supply chain optimization strategy. (source: OSCC)

Permanent Modular Construction (PMC) - 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 traditional site construction. Also referred to as Volumetric Construction, particularly in the U.K.

Precast concrete - A construction product produced by casting concrete in a reusable mold “form” which is then cured in a controlled environment, transported to the construction site and lifted into place.

Prefabrication - The manufacture of sections of a building at the factory so they can be easily and rapidly assembled at the building site.

Relocatable/Industrialized building - A partially or completely assembled building that complies with applicable codes and state regulations, and is constructed in a building manufacturing facility using a modular construction process. Relocatable modular buildings are designed to be reused or repurposed multiple times and transported to different sites.

Repurpose - To divert a material, product, component, module, or building from the waste stream for use for an application that is different than its original use or occupancy.

Reuse - To divert a material, product, component, module, or building from the waste stream in order to use it again for a purpose that is consistent with its original use or occupancy.

Structural Insulate Panel (SIP) - A high performance building system for residential and light commercial construction. The panels consist of an insulating foam core sandwiched between two structural facings, typically oriented strand board (OSB). SIPs are manufactured under factory controlled conditions and can be fabricated to fit nearly any building design. (source: SIPA)

Tilt-up panel - Tilt-up, tilt-slab or tilt-wall is a type of building and a construction technique using concrete. With the tilt-up method concrete elements (i.e. walls, columns, structural supports, etc.) are formed horizontally on a concrete slab, usually the building floor, but sometimes a temporary concrete casting surface near the building footprint. After the concrete has cured, the elements are “tilted” to vertical position with a crane and braced into position until the remaining building structural components (roofs, intermediate floors and walls) are secured.
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# MODULAR BUILDING INSTITUTE

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<td>Kelly Williams</td>
<td>Champion Commercial</td>
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<td>Treasurer</td>
<td>Mike Rhodes</td>
<td>Silver Creek Industries</td>
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<td>Executive Director</td>
<td>Tom Hardiman</td>
<td>Modular Building Institute</td>
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<tr>
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<td>Chris Peterson</td>
<td>Satellite Shelters, Inc.</td>
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<tr>
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## MBI STAFF

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RELOCATABLE BUILDINGS
Annual Report

The definitive source for information about the relocatable building industry in North America

CHANGING THE WAY THE WORLD BUILDS
GREENER. FASTER. SMARTER.
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 twenty 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.
The commercial modular building industry is comprised of two distinct divisions, both represented by MBI:

**Relocatable Buildings (RB)** - A partially or completely assembled building that complies with applicable codes and state regulations, and is constructed in a building manufacturing facility using a modular construction process. Relocatable modular buildings are designed to be reused or repurposed multiple times and transported to different 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 traditional site construction.

**Residential Modular** – One and two family factory-built structures designed to meet state and local building codes. Commonly built to the International Residential Code (IRC) or some code modeled after the IRC.

**Institutional or Industrial** – Modular construction in reference to this application typically involves mechanical and electrical systems, piping and components of larger industrial structures such as off-shore oil rigs or industrial plants. While utilizing the modular construction processes, the result is not typically a completed three-dimensional (or volumetric) building as in the other cases.
FLEXIBILITY
Some facilities are used as an adjunct to existing buildings, while others are stand-alone facilities. Flexibility and reutilization are the hallmarks of relocatable buildings. Unlike structures built onsite, which generally have fixed utilization and occupancy design, relocatable units fulfill a unique function of reutilization that is not site-specific. It is not unusual to have a relocatable building serve a wide variety of users during its long life span.

The flexibility of these buildings makes them a secure investment. During severe economic downturns, these conditions allow lessors to enjoy cash flows adequate to service debt. This flexibility is further enhanced by the ability to relocate buildings to more prosperous cities or industries as opportunities arise. Certain market segments of the industry are counter-cyclical. This is particularly true of education, prisons and governmental agencies that want to transfer funding for facility needs from capital budgets to operating budgets. This concept also applies to industries that may want to expand but are uncertain about the long-term strength of their growth. Budget driven companies often opt for leased facilities. In such cases, modular buildings offer benefits and options without long-term capital commitments.

RAPIDLY DEPLOYMENT
No other method of construction allows for such rapid deployment of space. In cases of large scale natural disasters, code compliant relocatable buildings can be deployed within days to provide shelter, medical clinics and classrooms to help restore a sense of normalcy to a community.

REMOTE LOCATIONS
Given that relocatable buildings are constructed offsite in controlled settings, finding a skilled labor force in remote locations is less of an issue. From the hottest, driest desert locations to the coldest, most severe winter climates, relocatable buildings can be utilized anywhere.

SHORTER DEPRECIATION SCHEDULES
The primary difference between permanent construction and relocatable buildings is that in many cases, relocatable buildings are not permanently affixed to real estate. This allows for the building to be considered personal property or equipment and depreciated over a shorter span. While MBI provides a guideline in this appendix, it is important to consult a professional tax advisor on this matter.

SUSTAINABILITY
Relocatable buildings have been frequently criticized as being less than energy efficient structures in and of themselves. However, in recent years, many end users are beginning to realize the positive environmental impact of relocatable buildings. The very fact that the building is designed and constructed to be reused and relocated at multiple sites eliminates the need to build new structures at each of the subsequent locations of the relocatable building. In short, one relocatable building moved to 10 different locations throughout its life takes the place of the energy required and waste associated with constructing 10 separate buildings. Relocatable buildings are 100 percent reusable.
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 North America 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.

In 2013 the education market was down for the industry. Overall fleet utilization in the U.S. in this market was 43.5% overall based on data from over 25,000 relocatable classroom units available to be leased. Our data suggests that the education fleet decreased by approximately 5% in 2013. Utilization varied greatly among U.S. regions (see U.S. regional data for more specific information). The education market made up 10% of total rental revenue for the industry in 2013.
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.

This is the largest market in the U.S. for the relocatable building industry in 2013, comprising 30% of rental revenues. A rebound in U.S. construction activity has helped boost this market.

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 and furniture and equipment leasing.

This market has grown the most significantly over the past three years. In 2013, this market accounted for 23% of industry revenues, up from less than 10% just a few years ago.
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. This market generated 9% of revenue for the industry in 2013.

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. This market generated 15% of industry rental revenue in 2013.
One of the key drivers to industry growth over the past three years has been the workforce accommodations market. This market centers on energy extraction activities prevalent in certain regions in North America—specifically Northern Alberta, Alaska, North Dakota, and Texas.

Overall, this market accounted for about 13% of total industry rental revenue in 2013. However, that percentage varies greatly depending upon regions. For some companies in the primary energy regions above, this market accounts for 60% of revenue.

Over the past three years, the industry has built and sold tens of thousands of workforce housing units to various energy companies, developers, and private interests.

Additionally, there are tens of thousands of housing units that have been built and are being operated by the industry as “open camps.” Where possible, we have attempted to include these open camp units in our overall calculations. For example, the Canadian region data is heavily influenced by this market.

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.

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, recordkeeping, industrial manufacturers, retailers and others.
We would like to thank AccuVal Corporate Valuation and Advisory Services for assisting with data collection. In addition to aggregate data provided by AccuVal, data for this report was compiled from a variety of additional sources, including a prepared survey questionnaire sent to members and non-members in the industry, public filings (Edgar in the U.S. and Sedar in Canada), information obtained from state and provincial modular regulatory agencies, and direct communication with company leaders.

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:

- 321992 – pre-fabricated wood buildings and structures
- 332311 – pre-fabricated steel buildings and components
- 236220 – commercial building construction
- 531120 – commercial building rental or leasing
- 721310 – worker camps and dormitories

And more recently with the explosion of open camps, more industry companies are engaging in NAICS 721310 – worker camps and dormitories.

MBI obtained data from a variety of sources including publicly available data, surveys, and direct communication. In all, data was collected from seventeen companies collectively owning and renting over 250,270 units in North America (inclusive of eight companies owning over 30,000 units in Canada) as well as data from five Australian companies owning and leasing over 28,000 units.

The data in this report represents about 66% of the total 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.

It is important to note that not all data collected from each company was used in every statistical calculation. Where possible, we have indicated the percent of the fleet used in various calculations. This report is not intended to be scientific in nature. Rather, it represents the most comprehensive single source of data on a diverse industry over a broad geographic region and within multiple markets.

All financial information is in U.S. dollars unless specified otherwise.
Based on a 2011 report by Sage Policy Group analyzing thousands of relocatable building transactions over a 10 year period, the average annual return on investment of a relocatable building sold was 18 percent, which was achieved after an average holding period of 5.8 years. (Source: Sage Policy Group, Inc. The Economic & Financial Performance of the U.S. Modular Building Industry)

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.

The 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 one or two 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.

The mean annual depreciation has ranged between 5 - 6 percent for the last several years.

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 of 108% percent of the original investment, as reported for year-end 2013.

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 percent 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.
MBI estimates that there are a total of more than 560,000 code-compliant relocatable buildings in use in North America today. Public school districts across North America collectively own and operate about 180,000 relocatable classrooms, with the industry owning and leasing about 380,000 buildings — roughly 80,000 of which are classrooms. 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 storage and shipping containers, although these units typically make up about 15 percent of a provider’s fleet.

Unlike prior industry reports, MBI has included workforce housing accommodations in this report. For purposes of this report, units that are industry-owned and leased as “open camps” are included.

MBI obtained lease fleet data from fifteen providers, comprising 250,000 units or about 66% of the North American market. For year-end 2013, the overall utilization rate was 66.5% across all market segments.

MBI obtained revenue data from twelve of the larger North American providers of leased units, controlling about 64% of all industry units owned. These companies collectively generated about $3.5 billion in 2013. Quality, availability, and service are key factors for customers in deciding which company to use. However, the relocatable buildings industry is very competitive and cost driven with the average rental income per unit being similar among competitors. As such, we estimate the total North American revenues for the relocatable buildings industry to be approximately $5.5 billion.

MBI also obtained data regarding assets from nine of the largest North American companies in this industry with total assets exceeding U.S. $4.5 billion. Collectively, it is estimated that the industry owns over $6.0 billion in assets in North America.

While it is difficult to estimate the total capital expenditures by this industry, we have obtained data from eleven U.S. and Canadian based companies with total 2013 capital expenditures in excess of $500 million.

### NORTH AMERICAN MARKET

<table>
<thead>
<tr>
<th>Classrooms</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Publicly-owned by school districts</td>
<td>180,000</td>
<td>N/A</td>
</tr>
<tr>
<td>Industry-owned fleet (including open camps)</td>
<td>80,000</td>
<td>300,000</td>
</tr>
<tr>
<td>Totals</td>
<td>260,000</td>
<td>300,000</td>
</tr>
</tbody>
</table>
According to Statistics Canada, public and private organizations and the housing sector intend to invest $404.5 billion in construction, machinery and equipment in 2014, up 1.4% from 2013.

Without question, the Canadian market, particularly the western provinces, have been heavily impacted by infrastructure needed for the energy extraction industry. Alberta anticipates a construction investment increase in 2014 of $2.7 billion as a result of higher investment intentions for the mining and oil and gas sector. Total investments by the oil and gas sector investments are expected to top $71 billion in 2014, a 3.1% increase from 2013.

For the relocatable buildings industry, workforce housing/accommodations market has been the key driver for growth in Canada. While this has primarily been driven by the Fort McMurray, Alberta Oil Sands Region, other key drivers include the Manitoba Hydro Project. Additionally, optimism continues to grow in the region as the need for infrastructure is expected to increase in support of liquefied natural gas (LNG) projects in British Columbia.

Ontario expects an increase of $2.6 billion fueled largely by public administration spending. Higher public sector capital investment across Canada is expected to continue rising to nearly $90 billion in 2014. A strong construction market is a positive indicator for the relocatable buildings industry as many products such as construction site offices and temporary office and administrative spaces are often leased during construction activities.

MBI currently represents about fifty companies based in Canada, including twenty-two manufacturers of modular structures. Several of these members have global operations and are among the largest companies in the industry.

MBI obtained data from eight Canadian companies with a collective lease fleet of 30,217 units including open camps. Overall fleet utilization for the Canadian market was 76.1%. MBI obtained additional data indicating that the utilization rate for markets excluding workforce housing was 81.4% for the western Provinces of Canada and 79.1% for the eastern Provinces.

Data collected from six of these Canadian companies showed total revenue of $2.1 billion and total assets of $2.57 billion. These companies represent some of the largest in the industry, therefore we caution against making general assumptions about the overall size of this market based on the average of these. To further illustrate this point, three of these companies accounted for over $300 million in capital expenditures in 2013.

MBI obtained revenue and employee data from six other companies not included in the above calculations. These six companies averaged $20,000,000 in revenue and 114 employees, ranging in size from $5,000,000 - $50,000,000 in sales.
In the U.S. market, MBI obtained data on companies with a total of 139,762 units in their collective lease fleets. Of these, 87,639 units were on lease at 12/31/13 for an industry-wide utilization rate of 62.7%. Overall, the fleet size remained relatively constant, with a total of only 1,500 units added from these reporting companies, or just over one percent.

This data was further segregated into product types including single-wides, office complexes and educational units. Total U.S. utilization at 12/31/13 for these segments are:

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Utilization Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-wides</td>
<td>65.2%</td>
</tr>
<tr>
<td>Office complexes</td>
<td>65.9%</td>
</tr>
<tr>
<td>Educational units</td>
<td>43.5%</td>
</tr>
</tbody>
</table>

This data varied by “hubs,” or regions, 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 on the next page.

### U.S. REGIONAL – MARKET & TOTALS

#### NORTH CENTRAL

#### NORTHWEST

#### WESTERN

#### SOUTHWEST

#### SOUTHEAST

#### MID-ATLANTIC


The NE region of the United States was one of the stronger regions for the industry in 2013, with an overall utilization rate of 75.2% among the 9,400 plus units reported as of 12/31/13. A strong utilization for single-wides as well as strong growth in this product category in this region improved the overall figures. Challenging transportation requirements and a generally heavy-handed approach to regulations are key challenges to future growth in this region.

### Fleet Owners: Relocatable Buildings (exclude storage containers)

<table>
<thead>
<tr>
<th>Region</th>
<th>ME, VT, NH, MA, CT, RI, NY</th>
<th>VA, WV, PA, MD, DC, DE, NJ</th>
</tr>
</thead>
<tbody>
<tr>
<td># of singles in fleet @ 12/31/13</td>
<td>6,026</td>
<td>7,945</td>
</tr>
<tr>
<td># of singles in fleet @ 12/31/12</td>
<td>5,552</td>
<td>7,812</td>
</tr>
<tr>
<td>Percent increase or decrease from prior year</td>
<td>9%</td>
<td>2%</td>
</tr>
<tr>
<td># of singles on lease @ 12/31/13</td>
<td>4,728</td>
<td>5,303</td>
</tr>
<tr>
<td>Utilization of singles @ 12/31/13</td>
<td>78.46%</td>
<td>66.75%</td>
</tr>
<tr>
<td># of floors in complexes in fleet @ 12/31/13</td>
<td>2,680</td>
<td>5,391</td>
</tr>
<tr>
<td># of complexes in fleet @ 12/31/12</td>
<td>2,839</td>
<td>5,377</td>
</tr>
<tr>
<td>Percent increase or decrease from prior year</td>
<td>-6%</td>
<td>0%</td>
</tr>
<tr>
<td># of complexes on lease @ 12/31/13</td>
<td>1,940</td>
<td>3,391</td>
</tr>
<tr>
<td>Utilization of complex @ 12/31/13</td>
<td>72.39%</td>
<td>62.90%</td>
</tr>
<tr>
<td># of classrooms in fleet @ 12/31/13</td>
<td>707</td>
<td>3,134</td>
</tr>
<tr>
<td># of classrooms in fleet @ 12/31/12</td>
<td>732</td>
<td>3,327</td>
</tr>
<tr>
<td>Percent increase or decrease from prior year</td>
<td>-3%</td>
<td>-6%</td>
</tr>
<tr>
<td># of classrooms on lease @ 12/31/13</td>
<td>408</td>
<td>1,397</td>
</tr>
<tr>
<td>Utilization of classrooms @ 12/31/13</td>
<td>57.71%</td>
<td>44.58%</td>
</tr>
</tbody>
</table>

#### NORTHEAST REGION

Hub 2 – Virginia, West Virginia, Pennsylvania, Maryland, District of Columbia, Delaware, and New Jersey

Overall utilization for the 16,470 units reported in this region was 61.3%, significantly impacted by a low utilization of educational units at 44.6% despite a “downsizing” of educational units in this region of 6%.

Many of the industry’s larger fleet owner are headquartered in this region, potentially impacting the total fleet size. Single-wides also fared better in this region with a 66.8% utilization rate.
**SEATTLE REGION**

**Hub 3** — Florida, Georgia, Alabama, Mississippi, North Carolina, South Carolina, and Tennessee

Despite a downsizing of the overall fleet in this region of 6.1%, utilization was still well below the national average for each product type. This region reported having the most educational units among the reporting companies, but the lowest overall utilization in the educational market at 41%. This excess capacity of classrooms in the region will lead to a downward pressure on rental income and/or a shifting of these assets to other regions with comparable code requirements.

<table>
<thead>
<tr>
<th>Fleet Owners: Relocatable Buildings (exclude storage containers)</th>
<th>FL, GA, AL, MS, NC, SC, TN</th>
</tr>
</thead>
<tbody>
<tr>
<td># of singles in fleet @ 12/31/13</td>
<td>13,770</td>
</tr>
<tr>
<td># of singles in fleet @ 12/31/12</td>
<td>14,933</td>
</tr>
<tr>
<td>Percent increase or decrease from prior year</td>
<td>-8%</td>
</tr>
<tr>
<td># of singles on lease @ 12/31/13</td>
<td>7,563</td>
</tr>
<tr>
<td>Utilization of singles @ 12/31/13</td>
<td>54.92%</td>
</tr>
<tr>
<td># of floors in complexes in fleet @ 12/31/13</td>
<td>13,194</td>
</tr>
<tr>
<td># of complexes in fleet @ 12/31/12</td>
<td>13,856</td>
</tr>
<tr>
<td>Percent increase or decrease from prior year</td>
<td>-5%</td>
</tr>
<tr>
<td># of complexes on lease @ 12/31/13</td>
<td>7,394</td>
</tr>
<tr>
<td>Utilization of complex @ 12/31/13</td>
<td>56.04%</td>
</tr>
<tr>
<td># of classrooms in fleet @ 12/31/13</td>
<td>11,518</td>
</tr>
<tr>
<td># of classrooms in fleet @ 12/31/12</td>
<td>12,180</td>
</tr>
<tr>
<td>Percent increase or decrease from prior year</td>
<td>-5%</td>
</tr>
<tr>
<td># of classrooms on lease @ 12/31/13</td>
<td>4,759</td>
</tr>
<tr>
<td>Utilization of classrooms @ 12/31/13</td>
<td>41.32%</td>
</tr>
</tbody>
</table>

**SOUTHWEST REGION**

**Hub 4** — Louisiana, Texas, Arkansas, New Mexico, Oklahoma

The region is among the strongest in terms of single-wide and complex utilization, but among the lowest in the educational market. The low utilization in the educational sector, however, is driven by a significant increase in the number of educational units reported by these companies compared to the previous year. This excess capacity of classrooms in the region will lead to a downward pressure on rental income and/or a shifting of these assets to other regions with comparable code requirements.

The increase in units corresponds well with the number of units decreased in neighboring Hub 6, indicating some companies may have moved assets from Arizona and New Mexico into Texas as that market is strong as a result of energy developments and job growth.

<table>
<thead>
<tr>
<th>Fleet Owners: Relocatable Buildings (exclude storage containers)</th>
<th>LA, TX, AR, NM, OK</th>
</tr>
</thead>
<tbody>
<tr>
<td># of singles in fleet @ 12/31/13</td>
<td>8,468</td>
</tr>
<tr>
<td># of singles in fleet @ 12/31/12</td>
<td>8,149</td>
</tr>
<tr>
<td>Percent increase or decrease from prior year</td>
<td>4%</td>
</tr>
<tr>
<td># of singles on lease @ 12/31/13</td>
<td>6,386</td>
</tr>
<tr>
<td>Utilization of singles @ 12/31/13</td>
<td>75.41%</td>
</tr>
<tr>
<td># of floors in complexes in fleet @ 12/31/13</td>
<td>8,901</td>
</tr>
<tr>
<td># of complexes in fleet @ 12/31/12</td>
<td>9,035</td>
</tr>
<tr>
<td>Percent increase or decrease from prior year</td>
<td>-1%</td>
</tr>
<tr>
<td># of complexes on lease @ 12/31/13</td>
<td>7,243</td>
</tr>
<tr>
<td>Utilization of complex @ 12/31/13</td>
<td>81.37%</td>
</tr>
<tr>
<td># of classrooms in fleet @ 12/31/13</td>
<td>6,756</td>
</tr>
<tr>
<td># of classrooms in fleet @ 12/31/12</td>
<td>6,473</td>
</tr>
<tr>
<td>Percent increase or decrease from prior year</td>
<td>173%</td>
</tr>
<tr>
<td># of classrooms on lease @ 12/31/13</td>
<td>3,094</td>
</tr>
<tr>
<td>Utilization of classrooms @ 12/31/13</td>
<td>45.80%</td>
</tr>
</tbody>
</table>

**CENTRAL REGION**

**Hub 5** — Ohio, Kentucky, Indiana, Michigan, Illinois, Wisconsin, Minnesota, Iowa, and Missouri

The so-called “rust-belt” region of the country suffered significantly during the economic recession, but appears to be rebounding. Overall utilization in this region is 66.1%, above the overall average for the country. Educational facility utilization, while still weak at 56.2% is stronger than other regions.

The total fleet size in this region showed slight growth, with a 1.7% increase in the number of units reported.

<table>
<thead>
<tr>
<th>Fleet Owners: Relocatable Buildings (exclude storage containers)</th>
<th>OH, KY, IN, MI, IL, WI, MN, IO, MO</th>
</tr>
</thead>
<tbody>
<tr>
<td># of singles in fleet @ 12/31/13</td>
<td>7,687</td>
</tr>
<tr>
<td># of singles in fleet @ 12/31/12</td>
<td>7,004</td>
</tr>
<tr>
<td>Percent increase or decrease from prior year</td>
<td>1%</td>
</tr>
<tr>
<td># of singles on lease @ 12/31/13</td>
<td>5,319</td>
</tr>
<tr>
<td>Utilization of singles @ 12/31/13</td>
<td>75.41%</td>
</tr>
<tr>
<td># of floors in complexes @ 12/31/13</td>
<td>4,754</td>
</tr>
<tr>
<td># of complexes in fleet @ 12/31/12</td>
<td>4,692</td>
</tr>
<tr>
<td>Percent increase or decrease from prior year</td>
<td>1%</td>
</tr>
<tr>
<td># of complexes on lease @ 12/31/13</td>
<td>3,021</td>
</tr>
<tr>
<td>Utilization of complex @ 12/31/13</td>
<td>81.37%</td>
</tr>
<tr>
<td># of classrooms in fleet @ 12/31/13</td>
<td>1,201</td>
</tr>
<tr>
<td># of classrooms in fleet @ 12/31/12</td>
<td>1,009</td>
</tr>
<tr>
<td>Percent increase or decrease from prior year</td>
<td>1%</td>
</tr>
<tr>
<td># of classrooms on lease @ 12/31/13</td>
<td>675</td>
</tr>
<tr>
<td>Utilization of classrooms @ 12/31/13</td>
<td>56.20%</td>
</tr>
</tbody>
</table>

**WESTERN REGION**

**Hub 6** — California, Arizona, Nevada, and Utah

The performance in this region appears to be very product specific. Single-wides and educational units fell below the national average, while complexes fared well above average. As previously mentioned, school districts within the State of California are the largest owners of relocatable classrooms, with over 85,000 units. Companies reporting data indicated that a high percentage of educational units were either sold from the fleet or moved into other regions.
NORTHWEST REGION

Hub 7 – Oregon, Washington, Idaho, Alaska, and Hawaii

While the educational facility utilization in this region was among the highest in the country, it should be noted that this calculation is based on a very small number of units. Utilization of complexes in this region was the highest in the country at nearly 79%. While single-wide utilization was low, it should be noted that there was a 13% increase in this product type and the low figures could be a result of timing and moving more assets into the region for future opportunities.

Fleet Owners: Relocatable Buildings (exclude storage containers)

<table>
<thead>
<tr>
<th>OR, WA, ID, AK, HI</th>
<th>CO, KS, NE, SD, ND, WY, MT</th>
</tr>
</thead>
<tbody>
<tr>
<td># of singles in fleet @ 12/31/13</td>
<td>2,357</td>
</tr>
<tr>
<td># of singles in fleet @ 12/31/12</td>
<td>2,055</td>
</tr>
<tr>
<td>Percent increase or decrease from prior year</td>
<td>15%</td>
</tr>
<tr>
<td># of singles on lease @ 12/31/13</td>
<td>1,631</td>
</tr>
<tr>
<td>Utilization of singles @ 12/31/13</td>
<td>69.20%</td>
</tr>
<tr>
<td># of floors in complexes in fleet @ 12/31/13</td>
<td>1,166</td>
</tr>
<tr>
<td># of complexes in fleet @ 12/31/12</td>
<td>969</td>
</tr>
<tr>
<td>Percent increase or decrease from prior year</td>
<td>20%</td>
</tr>
<tr>
<td># of complexes on lease @ 12/31/13</td>
<td>817</td>
</tr>
<tr>
<td>Utilization of complex @ 12/31/13</td>
<td>70.07%</td>
</tr>
<tr>
<td># of classrooms in fleet @ 12/31/13</td>
<td>270</td>
</tr>
<tr>
<td># of classrooms in fleet @ 12/31/12</td>
<td>295</td>
</tr>
<tr>
<td>Percent increase or decrease from prior year</td>
<td>-8%</td>
</tr>
<tr>
<td># of classrooms on lease @ 12/31/13</td>
<td>213</td>
</tr>
<tr>
<td>Utilization of classrooms @ 12/31/13</td>
<td>78.89%</td>
</tr>
</tbody>
</table>

NORTH CENTRAL REGION

Hub 8 – Colorado, Kansas, Nebraska, South Dakota, North Dakota, Wyoming, and Montana

Despite the relatively low number of total units reported for this region, overall utilization was well above average. This region saw an increase in total units of 14%. The increase and strong utilization could be a result of related energy markets in Colorado and North Dakota, or possibly as an impact of disaster relief from flooding in Colorado as tens of thousands of residents and homes were impacted.

Fleet Owners: Relocatable Buildings (exclude storage containers)

<table>
<thead>
<tr>
<th>CO, KS, NE, SD, ND, WY, MT</th>
<th>OR, WA, ID, AK, HI</th>
</tr>
</thead>
<tbody>
<tr>
<td># of singles in fleet @ 12/31/13</td>
<td>4,119</td>
</tr>
<tr>
<td># of singles in fleet @ 12/31/12</td>
<td>3,653</td>
</tr>
<tr>
<td>Percent increase or decrease from prior year</td>
<td>13%</td>
</tr>
<tr>
<td># of singles on lease @ 12/31/13</td>
<td>2,491</td>
</tr>
<tr>
<td>Utilization of singles @ 12/31/13</td>
<td>60.48%</td>
</tr>
<tr>
<td># of floors in complexes in fleet @ 12/31/13</td>
<td>1,132</td>
</tr>
<tr>
<td># of complexes in fleet @ 12/31/12</td>
<td>1,163</td>
</tr>
<tr>
<td>Percent increase or decrease from prior year</td>
<td>-3%</td>
</tr>
<tr>
<td># of complexes on lease @ 12/31/13</td>
<td>892</td>
</tr>
<tr>
<td>Utilization of complex @ 12/31/13</td>
<td>78.80%</td>
</tr>
<tr>
<td># of classrooms in fleet @ 12/31/13</td>
<td>215</td>
</tr>
<tr>
<td># of classrooms in fleet @ 12/31/12</td>
<td>225</td>
</tr>
<tr>
<td>Percent increase or decrease from prior year</td>
<td>-4%</td>
</tr>
<tr>
<td># of classrooms on lease @ 12/31/13</td>
<td>171</td>
</tr>
<tr>
<td>Utilization of classrooms @ 12/31/13</td>
<td>79.53%</td>
</tr>
</tbody>
</table>

U.S. SUMMARY

In all, the U.S market for relocatable buildings was a mixed bag. Some regions and markets appeared to do very well while others continue to struggle. The educational market appears to have lost some traction while support structures for various energy developments carried the industry in 2013.

As the cost to construct new relocatable units increases due to higher building code requirements, MBI anticipates the value of the existing units to hold their value well. This is evidenced again in 2013 as companies reported selling existing units in which costs were already recouped from rental activity (in some cases multiple times) at a ratio of 1.08x their original cost.
According to the Modular Building Industry Association of Australia, the transportable modular buildings industry is in excess of 80,000 buildings with capital investments of over $1.5 billion in fleet assets, employing over 4000 people with the capacity to manufacture in excess of $1 billion of modular product in Australia each year. MBI obtained data from six Australian companies engaged in the lease/hire of relocatable buildings. Collectively, these companies owned and leased 28,372 buildings, excluding storage containers. Many of these companies are affiliated with North American entities and are engaged in similar markets, including workforce accommodations.

At year-end 2013:

- Units on Lease = 21,324 or 75.2%

We also obtained revenue data from five companies totaling in excess of $500 million for 2013. Capital expenditures for three of these same companies was reported in excess of $86 million for 2013.

For more information on Australian Modular Building, please visit www.mbiaa.com.
The economic value of a leased mobile office or modular building is determined by comparing the total cost of 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 useful 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 to 6 percent for the last several years.

While there is no specific IRS ruling pertaining to depreciation of modular buildings, the following are intended to be general guidelines:

Always consult a professional tax advisor.

Visit the IRS Web site for additional resources: www.irs.gov/publications/p946/index.html

The determination as to which depreciation recovery period to apply to the building is based upon whether the property is considered real or personal.

Generally speaking, the buildings (modular units) alone do not qualify for a faster depreciation than real property. However, once affixed to a foundation, the decision as to whether the property is real or personal (permanent or temporary) falls within local jurisdiction.

Utilizing the six-way test that was established in the federal court cases of Whiteco and further used extensively in the Fox Photo case (a modular commercial structure), the courts recommend that it be viewed under the six-way test as established in the Whiteco case:

1. Is the property capable of being moved and has it in fact been moved?
2. Is the property designed or constructed to remain permanently in place?
3. Are there circumstances that show that the property may or will be moved?
4. How substantial a job is removal of the property, and how time consuming?
5. How much damage will the property sustain upon removal?
6. What is the manner of affixation to the property to the land?
A relocatable building is a partially or completely assembled building that complies with applicable codes and state regulations. But often times it’s hard to tell if a building has been inspected and meets the code requirements when it arrives at a new location. Given that the construction occurred offsite, and without the supervision of the local building code official, several states have implemented programs to ensure safety and code compliance in relocatable buildings. Typically, a manufacturing facility must meet state guidelines for quality and safety, the building plans must be approved by a licensed professional, and the building itself must be inspected by a qualified third party engineer or design professional. After a building has been inspected and determined to meet all the code requirements, a state label is affixed to demonstrate to local code officials that the building has in fact been inspected. This state label stays with the building throughout its life and multiple moves, provided the building is not significantly altered. If so, the owner must reapply to have the building re-inspected and have a new label affixed.

Simply relocating the building (unaltered) from one site to another does not trigger the recertification process. Unlike the “moved structures” section of the building codes, these units fall under the existing building codes section on “relocated or moved buildings.” The relocated units do need to meet all life safety, seismic, wind and snow requirements at the new location.

Often times, a fleet owner will have a building labeled in multiple states to expand the opportunity for future customers. In these cases, the building must be constructed to meet the requirements of the most stringent state.

In addition to a state label, customers should also look for and require an MBI label. This label indicates that the building was constructed and/or leased by a member of the trade association that subscribes to the industry’s code of ethics. The MBI label also has a toll free hotline for the owner to call with any issues or concerns about the building. The MBI label does not ensure compliance to any codes, but does give the owner some peace of mind about the integrity of the supplier.
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