



A NEW VISION

Metal building systems account for over 50% of the total low-rise non-residential construction market.

2015

Annual Report





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ABOUT MBMA

MBMA has served metal building systems manufacturers and suppliers for 59 years. Its membership represents more than \$2 billion in annual steel shipments and accounts for over 50% of the total non-residential, low-rise construction market in the United States. MBMA provides engineering leadership through the many research programs it sponsors annually, often in coordination with major universities and engineering schools throughout North America. This research is used to improve the performance, efficiency, and quality of metal building systems and to elevate the technology used to produce them.



“MBMA is finding ways to support the entire industry by providing knowledge and ideas to help architects and owners understand the inherent value of choosing a metal building system.”

Tom Gilligan, Chairman MBMA

Chairman’s Message

Focus on Leadership, Education, and Research

MBMA continues to evolve with a focus on overcoming barriers and blazing new trails to grow our members’ presence in the construction industry. Our charge is to provide leadership, research, and education that increases the prominence and usage of metal building systems. We are here to advocate metal building systems as the premier solution for performance, aesthetics, and sustainability in low-rise building construction.

Now into our second year of a three year strategic plan, we have turned a corner and see a bright future ahead. This year we implemented an educational component that will help train the next generation of engineers, architects, and construction professionals so they can take advantage of the many inherent benefits of metal building solutions. The Metal Building Contractors and Erectors Association (MBCEA), in consultation with MBMA members, has created an accreditation program for builders, IAS AC478. This is a companion program to IAS AC472, the accreditation that all MBMA Building Systems members are required to achieve. Together, these two programs provide a complete accounting of quality assurance from start to finish for metal building projects. This assurance takes our industry to a higher level. If accredited manufacturers and their builders team up with these two quality assurance programs it will make our industry more competitive and increase its prominence.

MBMA is also finding ways to support the entire industry by providing knowledge and ideas to help architects and owners understand the inherent value of choosing a metal building system. Metal buildings deliver unmatched value because collaboration can occur at the outset of design and optimize the critical path to completing the enclosure of the building shell. This not only reduces time in the design phase and in building completion, but it also allows for the remaining and far more costly construction scope to be completed more quickly. This speed-of-delivery is built into metal buildings because our industry is design-build oriented—that’s where we leverage the greatest value. Traditional, fragmented contracting processes simply cannot deliver the integrated approach to solving the critical path that is derived from design-build collaboration. We have a method to get everything in place much faster and without the interference inherent in traditional construction methods.

The metal building systems industry is on the rise and MBMA is providing the knowledge, research, and leadership, to help it achieve more success and greater market share.





Management Perspective

A Successful Transitional Year

2015 was a transitional year for MBMA that brought forth much progress toward the association's strategic plan goals. First, Chuck Praeger retired as Assistant General Manager, and handed over the day-to-day management responsibilities of MBMA to me. The move into this new role has been extremely fulfilling. I have enjoyed the chance to get involved in new ways, meet new people, and to work closely with the committee chairs and Board in establishing important new objectives and goals for the MBMA.

We also brought on a new staff engineer, Vincent E. Sagan, P.E. Vince has been an excellent addition to our staff, and he is right at home with the Technical Committee with his extensive steel design experience as a consulting engineer. Along with the staff transitions came a change in the governance of the association with important revisions to the bylaws, which help to streamline MBMA's processes and take advantage of technology such as electronic voting and virtual meetings.

MBMA's committees are also making excellent progress toward their objectives in support of the association's strategic plan, as outlined in detail later in this annual report. Looking back on what we have been able to achieve, it comes to mind that our collective efforts can be described by the acronym, PREVAIL.

“The move into this new role has been extremely fulfilling. I have enjoyed the chance to get involved in new ways, meet new people, and to work closely with the committee chairs and Board in establishing important new objectives and goals for the MBMA.”

Dan Walker, P.E., MBMA Assistant General Manager

MBMA MISSION

Progress: Toward making metal building systems the first choice solution for commercial low-rise construction.

Research: To provide the most powerful and practical research data to elevate the status of metal building systems in support of the members' goals.

Education: To help today's students and tomorrow's construction leaders grasp the value and flexibility of metal building systems by training them through university and continuing education coursework.

Vision: To perceive new, stronger, faster, better, building concepts as we use technology to enhance an owner's building possibilities.

Advancement: Toward proving the value of metal building systems by educating more and more owner and designer audiences so that they will naturally understand the benefits of systems construction methods.

Innovation: To continuously work with our committees and associate members to make improvements to metal building system components and characteristics through meaningful projects.

Leadership: For the metal building systems industry by providing technical research and innovations that will elevate this special building market to become the predominant, go-to solution for low-rise non-residential construction in every geography and for virtually any end use.

This acronym sums up the vision that made 2015 a successful year for MBMA. The big picture was made possible through many achievements in the past 12 months. Some of which include:

- A re-designed MBMA.com website.
- Introducing MBMA to new audiences through social media.
- An educational program built to bring college students up-to-speed on the value and ingenuity inherent in metal buildings.
- The completion of Athena Impact Estimator case studies that show the environmental benefits of metal building systems.
- An attention to the great value of teaming relationships with other associations, such as AISI, MCA, and MBCEA.
- A sharper focus on what MBMA is to become and how we can lead the industry into a great and prosperous position for the future.

2016 is coming ... and with it comes a renewed sense of purpose for MBMA, and the energy to achieve our goals.

MBMA provides leadership, research, and education that increase the prominence and usage of metal building systems as the premier solution for performance, aesthetics, and sustainability in building construction.

COMMITTEE ACCOMPLISHMENTS IN 2015

John H. Addington
General Manager

Daniel J. Walker, P.E.
Assistant General Manager

W. Lee Shoemaker, Ph.D., P.E.
Director of Research and
Engineering

Jay D. Johnson, LEED AP
Director of Architectural Services

Vincent E. Sagan, P.E.
Senior Staff Engineer

Jennifer M. Oblock
Client Services Administrator

Eva M. Brunk
Engineering Administrative
Assistant

MBMA has been managed by Thomas Associates, Inc. since 1956. Thomas is one of the longest running success stories among association management firms in the United States. It has an extensive and diverse technical team that can support the codes, standards, and research goals of its various client associations. Such synergy allows it to expand research capabilities and bring in human resources that enhance the technical strength of MBMA.





“AC472 benefits building owners, contractors, and developers, and lends a high level of credibility to all accredited building systems manufacturers.”

Chuck Haslebacher, Committee Chair

AC472 Accreditation High Impact Quality Assurance Initiative

The AC472 accreditation program is a high-impact quality assurance initiative that sets the pace for the industry. Administered through the International Accreditation Services (IAS), the program requires regular inspections of manufacturing facilities. Here are some of the top benefits:

- Establishes a quality assurance standard for metal building systems manufacturers
- Evaluates vendors, their capability and product offering
- Looks for processes and procedures that proactively assess quality and eliminate errors; also helps firms innovate and improve processes
- Audits each accredited company’s quality assurance and product quality
- Conducts reviews and establishes new standards as the industry evolves
- Builds quality awareness among employees

The program is based on the requirements of Chapter 17 of the International Building Code and provides code officials with a means to approve the inspection program of manufacturers involved in the fabrication of metal building systems.

MBMA’s Accreditation Committee works directly with IAS to monitor and assess the program and its value.

MBMA members communicate the program benefits to these audiences:

- Building Officials
- Building Owners
- Contractors
- Specifiers
- National Account Customers

It is this commitment to quality and excellence that helps make metal building systems a first choice construction solution.





“All forms of our media communications work toward our goal of communicating our vision: to become the First Choice Solution for Low-Rise Non-Residential Construction.”

Leslie Clark, Committee Chair

Communications

Bringing the MBMA Members’ Vision to Decision-Makers

In 2014, the MBMA formed a Communications Committee, with representatives from various MBMA committees. This group creates communications solutions in service to the following objective, as defined in MBMA’s 2014-2016 strategic plan:

Enhance and elevate the perception of metal building systems as a high quality, adaptable, durable, building construction approach which produces economy, speed to market, and single-source control.

This committee focused on the following initiatives:

- Help MBMA more clearly define its vision, both internally and externally.
- Help the association communicate the right message to the right audiences.
- Advocate for a strong educational component within the MBMA.
- Oversee all communications activities.

In 2015, numerous tactical elements have been executed. Here are a few:

1. **Social Media.** We expanded our reach by posting to tens of thousands of decision makers. As a result, some of these leaders are now interacting with us and visiting the MBMA website.
2. **Website.** With the launch of our re-designed website, we are gaining traction with search engines and increasing visitors. New statistics, literature, articles, webinars, and photography are regularly added to the site. In the future, the site will serve as a portal for our education initiative thereby driving more traffic to the site. We are also developing a new online store where we will offer more MBMA publication options.
3. **Public Relations.** We work with a high priority list of industry publications, magazines, and online content providers to develop articles that educate designers, owners, and the industry on the benefits of using metal building systems.



Expanding the Reach of Metal Buildings through Education:

During a 2014 Communications Steering Committee meeting, we realized that, in order to enhance the perception of metal buildings and realize long-term growth, we needed a strong educational component. As a result, an initiative was adopted by MBMA’s Education Committee that is showing great potential for enhancing the image and perception of metal building systems.



STEVE WEBER - JON WENSMAN - GAYLE GERBER - THERESA GRAPE - PHIL RAIMONDO - STEPHEN J. REINERS - CHRIS ROBBINS - JOHN UNDERWOOD - ZACHARY I. WALKER - TOM WRIGLEY - RANDY WEBB - MEL BOOKER - RODNEY HARRIS - CHARLES MULLALEY - ROY F. RUDOLPH - STEVE BURLEY - RYAN JENKINS - KENDELL SHORT - CRAIG BANNING - DON



CONRAD - DYLAN DIGREGORIO - DAN FRANS - ROHENA JHENSEN - TORI JOHNSON - DAN KUMM - RICHARD LEY -
IGOR MARINOVIC - SCOTT MARTIN - TOMMY TAGGART - TREY HERREN - CHARLES MILLS - LEO NEYER - RICHARD G.
9 STARKS, JR. - BRUCE BORTREE - LESLIE CLARK - DAVID EVERS - TOM GILLIGAN - ALLEN HARROLD - SANTIAGO MILLAN



“MBMA’s Education Committee was formed as a new committee in 2015, charged with the task of developing and managing education programs for students, design professionals, metal building manufacturers, and their contractors.”

Jerry Hatch, Committee Chair

Education Programs Influence Metal Building Choices

The Education Committee set three primary goals for its first year of service to MBMA members. They are:

1. Create a pilot capstone course for engineering and architectural students;
2. Create continuing education programs for architects; and
3. Create continuing education programs for engineers.

The committee started by developing a Request for Proposal for the capstone project. It was sent to hundreds of engineering school deans at universities throughout the United States. In a short time the committee received many excellent proposals from notable institutions. Six capstone grants were awarded, as follows:

- Dr. Justin Marshall - Auburn University
- Dr. Ron Ziemian - Bucknell University
- Dr. Mehdi Jalalpour - Cleveland State University
- Dr. Michael Seek (w/Mr. Nestor Escobales) - Old Dominion University

- Dr. John Cleary - University of South Alabama
- Marci S. Uihlein – University of Illinois School of Architecture

Each of the grant recipients have started working on their own unique capstone course which is a team-based senior design project. Each faculty member has been paired with a metal building manufacturer near them to develop a real-world design project utilizing a metal building.

Two of the programs started in the fall 2015 semester, and all will be completed by the end of the spring 2016 semester. With the unique perspective of these six capstone courses, the committee hopes to develop models for metal building focused capstone courses that can be available for universities throughout the United States. We hope these will engage interest from both engineering and architecture schools.



The committee and Dr. Shoemaker have also been busy working on various live continuing education courses for practicing engineers. Most notably, Dr. Shoemaker made presentations at two state chapter structural engineering meetings. He also participated in the National Council of Structural Engineers Association’s (NCSEA) annual meeting, where he attended sessions related to the development of CEU courses that target state structural engineering associations.

The committee also developed and put into place an online continuing education course with the AIA and *Architectural Record* magazine, which will run for 13 months via the continuingeducation.bnpmmedia.com continuing education online portal. The course, called “The Benefits of Metal Building Systems from a Whole Building Perspective” will run from December 1, 2015 through December 31, 2016. This is an exciting venture which should help architects nationwide to understand the many benefits of building with metal.



“The Energy Committee’s mission is to promote the use of metal building systems in the non-residential construction industry by encouraging fair and equitable treatment of metal building systems by energy codes, standards organizations, testing and rating groups, and other governmental and non-governmental groups.”

Ron Kuenkler, Committee Chair



Savings Abound for High-Performance Metal Buildings

The MBMA Energy Committee has had a busy year. Below are some of the highlights from our efforts:

Code Monitoring

Throughout 2015, the MBMA Energy Committee monitored and provided direction to energy codes and standard governing bodies, such as ASHRAE 90.1, the ICC International Energy Conservation Code (IECC) and the California Title 24 Energy Code. The Canadian energy code and the Washington, Maryland, and Vermont state energy codes will also be monitored in 2016.

Knowledge Sharing

The committee organized a well-attended, interactive, energy workshop that included presentations from Associate members about their latest energy-related innovations, as well as a presentation on the North Carolina Energy Conservation Code. The workshop also included updates from several researchers who are working on new calculation methods to determine the in-place U-factor of insulation assemblies to meet ASHRAE 90.1 and the Canadian Energy Conservation Code requirements.

Education Planning

In 2015, the committee began developing energy code compliance videos, to be completed in 2016. These videos will be a free resource to educate MBMA members and their builders, as well as designers and building owners, on how metal buildings can achieve code compliance.

Material Development

The committee is wrapping up development of a *Contractor’s Energy Guide for Metal Building Systems* to be used as a resource for builders. The guide, written in layman’s terms, contains pertinent energy code information and describes how to design a metal building to meet the provisions.

Since the level of building energy code stringency, adoption, and enforcement varies across the US, this document summarizes mandatory, prescriptive, and COMcheck trade-off provisions referenced in the *International Energy Conservation Code (IECC)* and ASHRAE 90.1. Additionally, metal building COMcheck case studies were developed to address a wide variety of building envelope materials that are used in metal building projects. These case studies provide solutions

for architects and engineers who may not be familiar with the metal building envelope options that meet today’s energy codes. These deliverables will be incorporated in the Contractor’s Energy Guide and will be available on the MBMA website.

The committee is also updating the *Energy Design Guide for Metal Building Systems* to include the 2012 and 2015 IECC, as well as the 2010 and 2013 editions of ASHRAE 90.1. The primary audience will continue to be architects, engineers and building code officials. We are targeting to complete this in the first quarter of 2016.

In 2016, the committee will also take on a major update of ORNL’s web-based Cool Roof Calculator, which is being jointly funded by MBMA, AISI, MCA and a number of other roofing industry groups interested in showing the energy savings potential of cool roofs compared to non-cool roofs.



- ED ARMER - TOM BOAL - MARTIN PAXTON - LARRY GUMPERT - RICH TRICE - ANDREW CARPENTER - CHRIS RICHARDS
- JASON FREIDENBERGER - PETER PAPAS - IRVING PYLATE - ROGER STORY - CORY HANN - MARK HENDRIXSON - JIM
MCINDOO - TOM MUKAVETZ - RONALD REED - CRAIG WAGNER - DANIEL WISE - MICHAEL GONG - AZAM OWASI - 12



DENNIS RIEMER - JIM USALIS - MARK PLATZ - AUSTIN BLACK - WAYNE GREGORY - MIKE HERRIN - DAVID LAME - MARK SPECHT - LARRY TENNANT - BRAD HEFFELMIRE - HAL ROBBINS - CHRIS BAILEY - DAVID MAZAK - DUANE MILLER - BOB SIKTBERG - PAT BRADSHAW - E. B. LUDWIG, III - KEN WELCH - STEVE HEIL - DEAN T. JORGENSON - TOM BOAL - COY



“Educating the marketplace on the availability of fire ratings for metal building systems has opened up new markets and has helped create a more desirable image of the industry.”

Andy Jaworski, Committee Chair

Protection and Performance Proactive Planning

Our committee’s mission is to encourage fair and equitable treatment of metal building systems by regulators, fire and building codes, insurance and insurance regulating and rating organizations, underwriters and re-insurance firms.

In 2015, our committee accomplished the following goals:

- Retained new general insurance counsel who will educate the committee members on the changes that have taken place in the fields of insurance and re-insurance.
- Developed a contractor focus group to bring together experts in the design, specification, manufacture, and erection of metal building systems to review and provide assistance in updating current fire-rated assemblies. This will help us to better position metal building systems in the marketplace.
- Provided technical assistance on metal building fire protection and metal building insurance to both MBMA members and other decision makers.

Moving Forward in 2016

The MBMA fire protection webinars have been successful for the past four years. The committee intends to broaden the audience by converting the webinars into a series of free, online video segments.

The committee will continue to utilize contractor focus groups to help members review MBMA’s insurance bulletins, MBMA’s Insurance Fact Book and all fire protection bulletins, and to identify ways to improve them and help identify an attractive promotional plan that will penetrate more markets.

The committee will also continue to maintain and update existing MBMA fire ratings. Three such ratings are: Head-of-Wall, Continuity Head-of-Wall, and Roof-Ceiling. We will investigate methods to include additional roof insulation systems, such as filled cavity and liner systems. All our efforts are oriented toward achieving a more attractive, complete, fire protection and energy efficient system.





“MBMA’s Safety Committee provides a mechanism to share ideas and principles in safety that relate to the metal building industry, and building collaborative relationships between MBMA member companies and associate members.”

Darin Gardner, Committee Chair



Safety Committee Initiatives

Building on What Works in Safety

Our committee works to establish the metal building industry as a leader in safe work practices. By focusing on safety and best practices, member companies benefit from tangible things such as:

- Protecting employees by creating a safe working environment
- Fewer lost work days and restricted duty assignments
- Less exposure in OSHA audits
- Reduced insurance premiums at renewal
- Improved morale and productivity

The Safety Committee also continues to produce quality training and idea sharing opportunities by undertaking the following:

1. Holding a popular and engaging annual safety workshop that focuses on leadership skills and sharing best practices in safety among MBMA member companies.
2. Planning four online webinars that are open to all MBMA members, including Associate members on issues such as preventing falls, training new hires and temporary workers, hand protection and safety, and mobile equipment training.

Annual Safety Awards

Safety awards were presented in May of 2015 at the MBMA spring meeting. Forty five manufacturing facilities submitted data for the OSHA Injury Statistics Safety Award program. The process was changed in 2013 to make the program more stringent, with only two levels of recognition: 1) Superior Safety Award for those companies with zero recordable injuries throughout the calendar year, and 2) Safety Performance Award for companies with an incident rate less than 50% or less than the industry average as reported by OSHA. Four MBMA member plants received a Superior Safety Award, and nine MBMA member plants were recognized with the Safety Performance Awards.

A record year for the Annual Safety Workshop

This year, the MBMA Annual Safety Meeting was held in Dallas, Texas with 26 attendees. The workshop included an interactive series of roundtable discussions where members shared a best practice from their facility with the group. Their innovations included the implementation of back-up cameras for forklifts, using lasers to mark lanes in the plant, and sources for anti-fogging eyewear. Attendees also learned the top ten OSHA citations for 2015, which will help them to be prepared to avoid these situations in their own plants

and be better prepared for a surprise audit. Another useful discussion offered ways to benchmark in-plant safety to track the types and frequency of incidents by demographics, such as which department, age, time of service, etc., with results broken down by month, quarter, and annual incident tracking. The group also discussed the dangers of smartphone use with regard to texting and driving, and the distractions they can cause in a manufacturing plant.

The Safety Committee will continue to hold an annual workshop and we are busy planning a new series of webinars in 2016 to share best practices to foster a culture of safety for the industry.



MARK WEAVER - JOAN SMIGEL - WILL FELAND - BEN HICKS - STEPHEN OWEN - LAURA LANZA - THOMAS MCKAY - SCOTT MOFFATT - ROCKY RAU - ROGER SIEJA - MARK SLAWIKOWSKI - JEFF KING - JOHN STAHL - TOM HAIC - RYAN RUHLMAN - MICHAEL BAILEY - ROBERT LYTLE - JIM BECKHAM - BRIAN JONES - FRANK FUCA - JOEL GRACE - DALE 16



17 NELSON - MARK PARKER - BERT CHOP - JONATHAN O'LEARY - JIMMY WORLEY - ROB HADDOCK - KEITH LIPPS - GERALD CARR - PAT KERN - MING ZHU - GERARDO DELEON - MIKE GIACOMO - DONNIE HUMPHRIES - JESUS IBANEZ - FRED KOETTING - ERIC MASTERSON - TANNER MOY - FRANK ROSALES - MATT STONE - ROGER COX - CRAIG OBERG - DAVID



“The MBMA Sustainability Committee was formed to ensure fair and equitable treatment for metal buildings by the many groups which publish standards relating to sustainability in the construction arena.”

John Underwood, Committee Chair

Sustainability

Studying the Environmental Benefits of Metal Building Systems

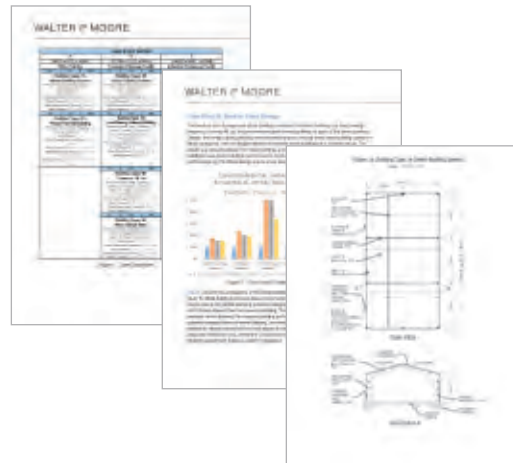
The MBMA Sustainability Committee was formed to ensure fair and equitable treatment for metal buildings by the many groups which publish standards relating to sustainability in the construction arena.

Life-Cycle Case Studies Now Available

In 2014, the MBMA Sustainability Committee engaged Walter P. Moore and Associates, Inc. to conduct a series of independent, whole building life-cycle assessments. These assessments compared environmental impacts of metal building systems against other types of construction. The comparisons, completed in 2015, were based on the results of the Athena Institute’s Impact Estimator software, which has the ability to quantify the environmental benefits of a metal building system versus masonry, conventional steel, wood, and concrete tilt-up construction.

This work relied on Life-Cycle Inventory (LCI) data previously collected from MBMA members by the Sustainability Committee. The data has since been incorporated into the Athena Impact Estimator software to benefit all users.

The completion of this study marks another important milestone toward the committee’s goal to credibly research, document, and promote, the sustainable benefits of metal building systems over other forms of construction.



Environmental Product Declarations (EPDs) Coming Soon

Our committee is also completing industry-wide EPDs to summarize the environmental attributes of a metal building system for primary framing, secondary framing, and metal cladding. The development of industry-wide EPDs for MBMA member use ensures the industry will be making substantiated “green” claims.

EPDs are developed according to a transparent ISO 14000 series standard that uses jointly developed Product Category Rules (PCR), Life-Cycle Assessments, and verifications by an independent reviewer.

Once completed, the MBMA EPDs will provide a reliable resource for both MBMA members and building designers. EPDs help specifiers and purchasers of metal buildings comply with a variety of green building codes, standards, and rating systems. Those who wish to be environmentally conscious on their own will have a way to compare the impacts their products have on the environment when compared to other forms of construction.

Codes, Standards, and Rating Systems Monitored

The Sustainability Committee monitors the development of the ICC International Green Construction Code (IgCC), ASHRAE 189.1 Standard for the Design of High-Performance Green Buildings, and the USGBC LEED Rating System for Building Design and Construction (BD+C). The next version of the IgCC and ASHRAE 189.1 will become a combined document in 2018, with the technical content developed under ASHRAE’s standards development process.

Our committee will have an opportunity to submit code change proposals for the next combined code in 2016. Although LEED version 4 was published in 2014, it will not officially replace LEED 2009 until the end of 2016. The committee will monitor the use of LEED v4 in the marketplace, as well as the anticipated increase in interest for specifying Environmental Product Declarations (EPDs), Health Product Declarations (HPDs), and Product Transparency Declarations (PTDs).



“MBMA’s Technical Committee pursues initiatives that enhance the position of a metal building system as the preferred form of construction for low-rise, non-residential construction. We manage and produce research projects, manuals, and guides, and participate in standards and specification committees.”

Scott Russell, Committee Chair

Building the Future Research and Guides for Improving Metal Building Systems

MBMA’s Technical Committee was very active in 2015. Below are the highlights.

Research Projects

Seismic Behavior of Metal Buildings

This multi-year project primarily addresses the height restrictions and potential for member compactness limitations that impact metal buildings in high seismic areas. This project is helping us understand and quantify inelastic behavior of tapered member frames. In addition to assisting in the development of appropriate seismic design procedures, this knowledge may propel us into a new era of performance-based design and advanced analysis.

In 2015, researchers from Johns Hopkins and Virginia Tech universities continued to validate a sophisticated computer model to reproduce the seismic behavior of metal building frames observed during full scale shake table tests. These computer models represent every structural component, including bolts, fasteners, braces, etc. As an indication of the complexity of these computer models, it takes approximately 8 hours on a supercomputer to reproduce 10 seconds of shake table testing.

Once the computer model is validated, a host of metal buildings will be evaluated in 2016 under severe seismic loading to ensure that they can absorb the required amount of energy before collapse. The appropriate seismic design requirements for a metal building rigid frame will emerge from this evaluation and will subsequently be submitted as an independently defined seismic force-resisting system to be added to the seismic provisions of the next edition of the ASCE 7 Standard.

Column Base Rotational Testing

The purpose of the testing is to understand column base stiffness behavior and use that information in frame modeling to reduce frame weight while maintaining lateral drift limits. We believe that a better understanding of baseplate behavior and how to quantify it as part of rigid-frame analysis will generate significant benefits and economies when included in our everyday design practices. This data will also be useful input into the seismic modeling effort. Full scale cyclic testing to determine the behavior of 11 different specimens has been carried out at the University of Houston. The results are currently being evaluated to answer the following questions:

- What factors affect whether the anchor rod will yield or pull out of the concrete?
- What influences whether the base plate will yield or the concrete will crack beneath the base plate?
- How much rotational stiffness is present for different column base configurations?
- Can this be a mechanism used to dissipate some of the energy from a seismic event?

Bolted End Plate Connections

As a result of this project, performed by Dr. Matthew Eatherton of Virginia Tech, four new bolted end-plate connection configurations have been developed and validated. These new configurations will allow metal building manufacturers to optimize design and provide a more competitive product. They will be incorporated into the next edition of AISC Design Guide 16. A new phase of testing is starting, which will add an option for metal building rigid frame connections in high seismic areas.

Limit State Design of Girts/Purlins Research

A series of research projects, performed by Dr. Cris Moen of Virginia Tech, resulted in a design approach for metal building wall and roof systems that has been adopted in the AISI S100 cold-formed steel specification. These provisions will improve industry competitiveness by reducing the need for costly testing, such as the base test, that currently defines capacity limits in AISI S100. The new approach can accommodate new products as they become available and will encourage a fresh look at the efficiency of existing wall and roof systems.

Shear Strength Research

This project, performed by Dr. Brad Davis of the University of Kentucky, extended the previous shear strength research on tapered members to prismatic (straight) members. This enabled a more general treatment of post-buckling shear strength evaluation in the AISC steel specification (AISC 360). This research has been adopted into the 2016 edition of AISC 360 and will dramatically increase the shear strength of typical metal building frames. This will result in more efficient design and more competitive metal buildings.



LITTLEFIELD - GREG PIRTLE - DAVID WEATHERFORD -DAVID E. DURHAM - DAIN R. DRAKE - JEFF ALEXANDER - DAVE ROSENBERG - AMANDA CHISHOLM - CRAIG EDWARDS - CHUCK HASLEBACHER -BOB HODGES - CHUCK RIMSKY - MAX SARGENT - STEVE BROWNING - MIKE MURPHY - JEFF SPRADLEY - JOSE ORTEGA - JACK STURDIVANT - STEVE WRIGHT



Jamb Design for Overhead Vehicle Doors

New design guidance will be incorporated into the next edition of the Metal Building Systems Manual based on this study. It will provide a rational approach for how to design the jamb for an overhead vehicular roll-up sheet door. The challenge was to develop a proper door jamb interface utilizing typical steel C section jambs. These jambs will rotate and affect the magnitude of the catenary forces imparted to the jambs as well as the deflection of the doors. Dr. Cris Moen (Virginia Tech) led the effort to develop a design tool that was validated to the tested door and jamb assemblies in the study.

Combined Lateral/Torsional Bracing

This project, being performed by Dr. Don White of Georgia Tech, evaluated how to take advantage of combining lateral and torsional bracing. He developed new design procedures that have been adopted into the commentary for Appendix 6 of AISI 360-16. These provisions enable a more sophisticated evaluation of primary frame design that should lead to more efficient utilization of flange braces. The next phase will be the development of a design guide and software module that will aid in applying the new provisions.

Florida Building Code HVHZ Panel Testing

Since the 1990s, building codes in south Florida have limited the allowable deflection for structural roof and wall metal panels to L/240, which is significantly more restrictive than the L/60 limit in the International Building Code (IBC). After meeting with the Miami-Dade County building officials, the MBMA, in conjunction with the MCA and Force Engineering & Testing, has been developing a test program targeted to demonstrate a need for a change of the Florida Building Code High Velocity Hurricane Zone (HVHZ) deflection limits. Initial test results are promising. The goal is to submit a code change proposal by the deadline of December 31, 2015.

Exploration Study on 3D Metal Building Analysis

As an offshoot of our seismic analysis efforts, Dr. Ben Schafer suggested that we explore the potential benefits of analyzing an entire structure, including frames, bracing, wall and roof secondary framing, flange bracing, and sheeting, as one three dimensional (3D) system.

The current approach is to design in two dimensions (2D). This is only possible because of the technologies developed in conjunction with the aforementioned seismic analysis project. We will compare the designs of two typical metal buildings against 3D models using the same methods and technologies used in the seismic study. We hope to better understand the design, manufacturing, and construction efficiencies this approach may bring, as well as the challenges to be overcome to implement a 3D design approach.

2014 Innovation Award Project, Comparison of Metal to TPO Roofing

This project was the 2014 MBMA Innovation Award winner, which was submitted by Dale Nelson of Roof Hugger, Inc. The scope of the project is to review information on metal and non-metal roofing systems, as well as building code requirements. The goal will be to summarize advantages and disadvantages of these systems in a report that can be used by the MBMA Communication Committee to educate owners, specifiers, contractors, and building officials about re-roofing systems. The steering group met several times to develop the scope and budget for this project, and is looking forward to completing the project in 2016.

Manuals and Guides

Updated Seismic Design Guide

The update to the Seismic Design Guide will result in a state-of-the-art document based on the latest code provisions, 2015 IBC and ASCE 7-10, which will also include commentary on the provisions of ASCE 7-16. It will be expanded with information related to recent MBMA-sponsored research, and address metal building specific issues in seismic design with supplemental information and rational explanations not found in other US standards. It will also include an expanded coverage of buildings with mezzanines. The new guide will serve as an educational tool for engineers and others not familiar with metal building system seismic design. The update is scheduled to be completed early in 2016.

New Field Inspection Handbook

This new MBMA publication for inspecting a metal building project will be a valued resource for building officials, engineers-of-record, contractors, erectors, owners, the insurance industry, and MBMA members. It will help eliminate misunderstandings and lead to shorter punch lists, faster project completion, and better constructed metal buildings. After a thorough review by MBMA members, it was also reviewed by the Metal Building Contractors and Erectors Association (MBCEA) to gather their input. The handbook is on schedule to be published by the end of 2015.

AISI D111 Design Guide Revision

This project will update and consolidate two existing purlin design guides (AISI CF97-1 and AISI D111), into one comprehensive resource. Material on gravity loading and through-fastened roof systems will also be added. The revised guide will cover all aspects of cold-formed steel purlin roof framing system design, according to the soon-to-be issued 2016 AISI Specification.

ATC Ground Snow Load Website

MBMA provided technical and financial assistance to the Applied Technology Council (ATC) for the development of a website, snowload.atcouncil.org, that provides a way to easily obtain snow load information based on GPS coordinates or a street address. This knowledge results in more efficient building designs. MBMA's contribution has been recognized on the sponsor page of the website.

As the Technical Committee looks forward to 2016, the projects performed in 2015 will provide the foundation for several proposed projects, including Panel Zone Behavior, Wind Load Research, Rod Brace Anchorage Design, and Weld Inspection Requirements for Full Penetration Welds.

MBMA Educational And Technical Resources Provide Valuable Information for the Industry

MBMA continues to lead the metal building systems industry and fulfill its mission by providing educational, research, and technical resources. These include an increasing number of design guides and manuals that are invaluable for anyone who works with metal buildings anywhere in the world. As new information becomes available and changes are made to all of these guides, updates are provided in MBMA's online bookstore at mbmamannual.com. MBMA also provides an array of free resources that can be found at mbma.com.

2012 Metal Building Systems Manual

- Nationally recognized reference manual for the metal building industry
- Used by building owners, manufacturers, general contractors, erectors, engineers, architects, specifiers, inspectors, and other building professionals
- 724-page resource comes with an electronic version of the manual along with 58 metal roof details in AutoCAD format
- Covers the 2012 International Building Code and the American Society of Civil Engineers/ASCE 7-10



Metal Roofing Systems Design Manual - Second Edition

- An important industry guide to current standards and codes
- Incorporates the results of research undertaken by MBMA, its members, and other industry groups
- Comes with a searchable CD that also includes the AutoCAD roofing details



Fire Resistance Design Guide For Metal Building Systems

- Addresses fire protection solutions related to metal building systems
- Explains fire test standards
- Includes prescriptive fire protection practices related to occupancy and construction options
- Offers extensive information on fire resistive provisions related to construction elements



Energy Design Guide For Metal Building Systems

- A complete reference for designing and constructing energy efficient metal buildings
- Includes details on a variety of state energy codes, standards, and compliance tools
- Provides information on cool roofs and a daylighting design guide, with appendices on photovoltaic roof panels



Concrete Masonry Walls For Metal Building Systems

- Published jointly with the National Concrete Masonry Association (NCMA)
- Highlights the advantages of metal buildings using concrete masonry hardwalls
- Includes recommendations on masonry design standards and industry practices, design aids, construction recommendations, and details for integrating masonry with metal buildings



Seismic Design Guide For Metal Building Systems

- It's out of print currently and the committee is working on a new version to be released later in 2016
- Published jointly with the International Code Council (ICC)
- Includes four practical design examples to illustrate acceptable approaches for dealing with the common seismic design issues, and provides insight into the impact of recent code developments





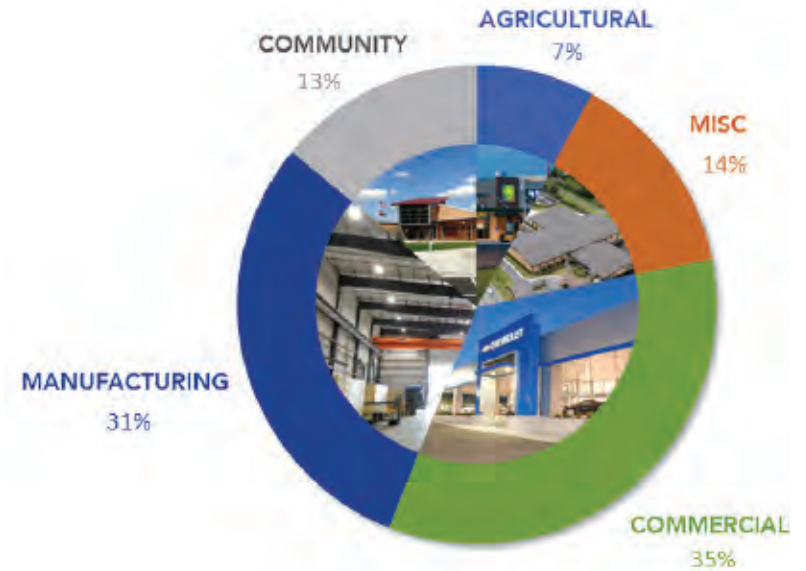


New Low-Rise Non-Residential Construction*
Square Feet (in millions)

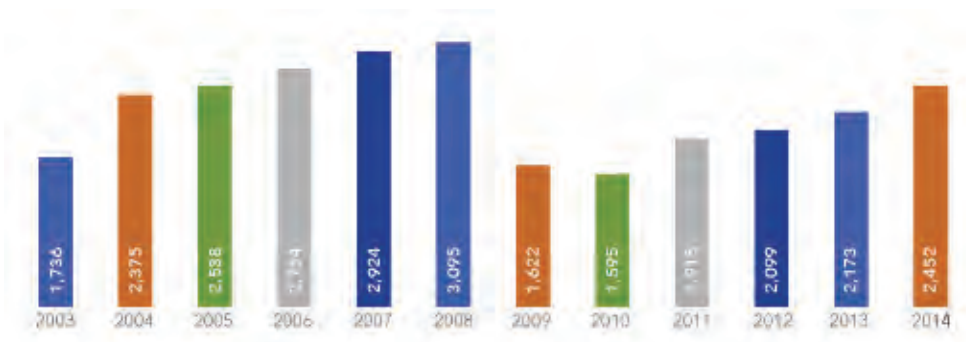


*Compared to F.W. Dodge data

2014 MBMA Market Share By Building Type



2003-2014 MBMA Member Sales
\$ (in millions of dollars)



MBMA Member Steel Shipments 2003-2014
Tons





MBMA

BUILDING SYSTEMS MEMBERS

A&S Building Systems
ACI Building Systems, LLC
AIM Metals, LLC
All American Systems
Alliance Steel, Inc.
American Buildings Company
Associated Steel Group, LLC
BC Steel Buildings, Inc.
Behlen Building Systems
Bigbee Steel Buildings, Inc.
BlueScope Buildings North America, Inc.
Butler Manufacturing
CBC Steel Buildings
Ceco Building Systems
Chief Buildings
CO Building Systems
Dean Steel Buildings, Inc.
Garco Building Systems, Inc.
Golden Giant, Inc.
Gulf States Manufacturers
Heritage Building Systems
Inland Buildings
Kirby Building Systems, Inc.
Ludwig Buildings Enterprises, LLC
Mesco Building Solutions
Metallic Building Company
Mid-West Steel Buildings
NCI Building Systems, Inc.
Nucor Building Systems
Oakland Metal Buildings, Inc.
Pinnacle Structures, Inc.
Red Dot Buildings
Robertson Building Systems
Ruffin Building Systems, Inc.
SBC Building Systems, LLC
Schulte Building Systems, Inc.
Spirco Manufacturing
Star Building Systems
Steel Systems
Trident Building Systems, Inc.
Tyler Building Systems, L.P.
United Structures of America, Inc.
Varco Pruden Buildings
Vulcan Steel Structures, Inc.
Whirlwind Steel Buildings, Inc.

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Company USA, Inc.



Metal Building Manufacturers Association
1300 Sumner Avenue
Cleveland, OH 44115-2851
(216) 241-7333
(216) 241-0105
www.mbma.com

