



# GAME CHANGERS

# TRANSFORMING THE CONCEPT of METAL BUILDINGS



**MBMA**  
METAL BUILDING MANUFACTURERS ASSOCIATION  
2013 ANNUAL REPORT





## MBMA MISSION

It is the mission of the Metal Building Manufacturers Association (MBMA) to advance the collective interests of the metal building systems industry.



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# GAME CHANGERS:

## MBMA IS TRANSFORMING THE CONCEPT OF METAL BUILDINGS

Jeff Carmean, Chairman, MBMA

**We are proud that MBMA is the industry leader when it comes to research and engineering for metal building systems.**

Even during a tough economic cycle, your association has invested in many highly significant milestone actions to improve building performance, open new markets and answer questions in the building code arena. These game changers are helping to grow the metal building systems industry.

Here are a few transformative examples:

- Through a multi-year research initiative, MBMA is examining how to expand the competitiveness of metal building systems in high seismic areas.
- Through wind load resistance testing, MBMA is amassing a greater understanding of the loads imparted by doors on metal jambs and will soon develop a jamb design procedure to ensure that the door/metal building interface performs well in high winds.
- MBMA is teaming with AISC to learn more about shear capacity of prismatic and tapered members to make metal building systems even more competitive.
- MBMA contracted with researchers at

Georgia Tech to develop a tool to design flange braces to improve frame optimization.

- Flexible platform research at Oak Ridge National Laboratory is studying the energy efficiency of metal buildings and demonstrating ways to retrofit facilities to reduce operating costs.
- MBMA research data is being introduced into the Athena Impact Estimator that will help define environmental impact and improvement opportunities with competing forms of construction.

A further game changer is the MBMA 2014-2016 Strategic Plan. Our responsibility is to get ahead of today's paradigms and plant the right seeds to impact the way metal building systems will be used in the future. We're all about increasing the pie; and that's what we address in the 3-year strategic plan. MBMA is the only association that is addressing the entire metal building systems industry and our planning will offer breakthroughs in all levels of building design, construction and performance.



## ABOUT MBMA

MBMA has served metal building systems manufacturers and suppliers for 56 years. Its membership represents more than \$2 billion in annual steel shipments and accounts for approximately 49% of the total non-residential low-rise construction market in the United States. MBMA provides engineering leadership through the many research programs that 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 LEADERSHIP

Charles M. Stockinger  
*General Manager*

Charles E. Praeger  
*Assistant General Manager*

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

Daniel J. Walker, P.E.  
*Senior Technical Engineer*

Jay D. Johnson, LEED AP  
*Director of Architectural Services*

Christine M. Devor  
*Engineering Administrative Assistant*

Eva M. Brunk  
*Administrative Assistant*

MBMA is managed by Thomas Associates Inc., one of the oldest and largest association management firms in the United States. It has an extensive and diverse technical team that can support the code, standards, and research goals of its various associations. Such synergy allows it to expand research capabilities and bring in human resources that enhance the technical strength of MBMA.



## HIGHER GROUND: METAL BUILDINGS BUILD A BETTER FUTURE

Charles Stockinger, General Manager, MBMA

**Metal building systems are far more**

**sophisticated today than they were a decade ago;** and due to MBMA's leading edge research programs, further evolution is not far down the road. MBMA has invested heavily in engineering technology, fabrication concepts, structural improvements and building quality. As a result, buildings today are far better in terms of cost, strength, function and aesthetics. Through these innovations, we are moving the industry to a higher level and helping to position the industry for long-term growth and greater acceptance as THE solution for most low-rise buildings.

MBMA is its members; and our members will attest that the industry has come a long way. One factor in its evolution comes through the success we have achieved in partnering and collaborating to work toward a common purpose and to conduct major research – such as seismic, sustainability, energy and fire resistance projects. This research has allowed us to establish new engineering

methods to document best practices and influence codes and standards.

MBMA serves as a forum for developing common industry objectives that help our member firms to achieve their missions. As these members establish and develop industry leaders, we keep them ahead of the curve by providing valued benchmarking trend data and access to state-of-the-art manufacturing and management tools. Through our interaction with the member firms, MBMA perpetuates technology transfer and promotes safety and quality assurance in manufacturing and engineering.

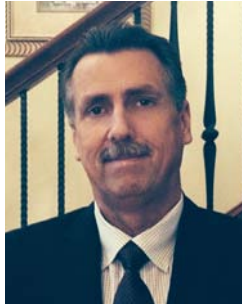
MBMA financial operations totaled \$1,748,999 in 2013 and included significant research, code and standards investment with oversight by the Executive Committee and Board of Directors. The association financials were audited by KMPG.

We are very proud to serve our members and to bring industry standards to a whole new level.

# MBMA COMMITTEES CHANGE THE INDUSTRY

## ENERGY COMMITTEE

Ron Kuenkler,  
Committee Chairman



### Energy Committee Mission

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.

### The Energy Committee's Three-Pronged Focus

1. Energy Codes and Standards
2. Research and Innovation
3. Education and Training

### Visionary Leadership Team Expands Market for Metal Buildings

An inclusive and participative group of

member/engineering/technical experts guide the Energy Committee in its strategies, projects and undertakings. Their goal is to promote energy research that will expand the market for metal buildings.

### Energy Codes and Standards

The MBMA Energy Committee is working to bring a semblance of order to the changing and broad range of building codes and standards. The committee is:

- Participating in ASHRAE, California Title 24, NASEO and the IECC activities.
- Producing educational programs, such as the COMcheck training and the energy webinars. ASHRAE 90.1-2013 will lead to big changes in building requirements for energy efficiency.
- Providing contractors, designers and builders with a solid understanding

of the code requirements related to ASHRAE 90.1 and the 2015 IECC and how to provide compliant building systems.

These efforts ensure that metal buildings can meet both the minimum requirements as well as high-performance specifications to make metal buildings the energy efficient system of choice for building owners.

### MBMA Partners with Oak Ridge National Laboratory (ORNL)

MBMA partners with ORNL on the Flexible Research Platform (FRP) project which studies a full-scale metal building on the ORNL campus that is computer controlled and continuously monitored with sophisticated sensors and equipment. It provides unique research statistics on the performance of a metal buildings and offers the ability to change out wall types, roof types, windows, light-transmitting panels and other aspects of a building to discover the most effective combinations



## ACCELERATED EVOLUTION: MBMA IS LEADING INDUSTRY INNOVATION



This corner detail, as built in the laboratory, is ready for air leakage evaluation. Careful detailing of the corner joint yields valuable information about improving the detail design.



A volunteer installer puts the finishing touches on this ridge installation just prior to performing an air leakage test.

to save energy for metal building owners.

### Air Infiltration

ASHRAE 90.1 continues to raise the bar on insulation and air-tightness requirements. Because of ASHRAE's recognition as a respected reference standard, the 2015 IECC requirements will be similarly revised.

One very important aspect that is already being studied on the Flexible Research Project building is the impact that air-infiltration has on the performance of a metal building.

- MBMA research on individual components and how they connect to each other helped define the future experiments on the full scale ORNL platform building.
- Component level testing studied the intersection of

common components, such as the eave-to-wall details, the eave-to-rake details, the ridge and wall corner and base details.

### ORNL and MBMA Partner for Research Road Mapping

MBMA and ORNL collaborated to create a long-range Research Roadmap for the metal building systems industry. This document outlines plans for testing, research into new and innovative methods of installation metal building products, and code compliance strategies for designers and practitioners. The roadmap is now available for members and others interested in metal building systems.



### Education and Training

MBMA has conducted so much important research and now it is critical to get this information to all MBMA members and their builders.

MBMA developed educational webinars in late 2011 on both fire code and energy code compliance for metal building systems. These two programs are planned to continue throughout 2014 and the new MBMA Webinar Voucher Program is helping to perpetuate interest from the members by allowing them to sponsor or underwrite their builder's attendance in these important educational sessions.

# RESEARCH AND INNOVATION: MAJOR RESEARCH UNDERWAY - EVERY DAY, EVERY HOUR, EXTENSIVE BUILDING SCENARIOS



## SUSTAINABILITY COMMITTEE

Brad Robeson, Chairman



### Sustainability Committee Mission

The MBMA Sustainability Committee was formed in 2009 to ensure fair and equitable treatment for metal buildings by the many groups which publish standards relating to sustainability in the construction arena. This committee:

- positions metal buildings as a premier green construction alternative.
- educates the MBMA membership regarding sustainability of metal buildings.
- promotes the metal building industry through AISI's sustainability efforts.
- works with other industry groups to improve the image of metal building systems.

**MBMA develops the scientific evidence to show the inherent advantages of steel and documents its environmental footprint.**

### Life Cycle and High Performance Top Efforts in 2013

MBMA's Sustainability Committee primarily focused their efforts on two task groups in 2013:

- The High Performance Green Building Task Group and
- The Life Cycle Assessment (LCA) Task Group.

### High Performance Green Building Task Group Influences Codes

The High Performance Green Building Task Group influences the development of green and sustainable codes and standards, as well as voluntary rating systems. This group monitored and submitted a number of proposals affecting the next editions/versions of the International Green Construction Code (IgCC), ASHRAE 189.1 Standard for the Design of High-Performance Green Buildings and the LEED Rating System for New Construction and Major Renovations.

### Life Cycle Assessment Task Group

The Life Cycle Assessment (LCA) Task Group produced a number of deliverables through their

**MBMA:**  
BUILDING A SUSTAINABLE FUTURE



work with the Athena Sustainable Materials Institute. These include:

1. Developing a transparent, peer-reviewed cradle-to-gate LCA of metal building assemblies
2. Uploading LCI data for the selected metal building assemblies into the U.S. NREL LCI database and the LCI data into the Athena Institute Impact Estimator software

3. Creating a clear path within the Impact Estimator software for architects/building owners to evaluate the LCA environmental attributes of a complete metal building system

4. Developing a cradle-to-gate LCA benchmarking tool for members to monitor and track their environmental improvement over time and compare their manufacturing plants against the industry average

The MBMA/Athena Institute contract deliverables were completed during the fourth quarter of 2013. MBMA will conduct a series of educational workshops in 2014, where each of the deliverables mentioned above will be released and explained in detail.



## COMMITTEE ON FIRE PROTECTION & RELATED INSURANCE MATTERS

Bob Hodges, Chairman

### Committee on Fire Protection & Related Insurance Matters Mission

Encourages 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.



### 2013: Studies, Webinars and a Whole Lot More

In 2013, this committee:

- Educated MBMA members, builders and designers about the available solutions in the marketplace
- Oversaw the fire protection webinar program
- Spearheaded the MBMA Insurance Study

- Initiated builder interviews to collect ideas for future fire rated designs and improvements to existing designs
- Performed the work to make MBMA an official ICC Education Provider partner, able to award professional development hours to building officials

### Plans for the Future

1. This committee will likely work on an update to MBMA's Fire Protection Design Guide for Metal Building Systems due to the number of copies we expect to sell with webinar voucher registrations. Plans are also in the works to discuss the possibility of selling the guide through the International Code Council (ICC) online bookstore and at code hearings.

2. Updates will be made to the MBMA Insurance Fact Book and MBMA Insurance Bulletins. Once revised, then they will be promoted through educational programs and news items.

3. The committee will continue to produce fire protection webinars, supported by a new MBMA webinar voucher program.



## SAFETY COMMITTEE

Stanley Reid, Chairman



### Safety Committee Mission

**MBMA's Safety Committee has been a mechanism to share ideas and principles in safety which relate to the metal building industry, build collaborative relationships between MBMA Member companies and Associate Members and establish the metal building industry as a leader in safety.**

By focusing on safety and best practices, member companies see specific, tangible results:

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

### 2013 Safety Committee Initiatives: Building Awareness

The MBMA Safety Committee produced a variety of results in 2013. The committee:

1. Held its annual meeting which focused on best practices in safety.
2. Developed a Safety Leadership team to

share committee initiatives and to prepare future committee leadership.

3. Increased utilization of the MBMA Safety website by MBMA member companies.

4. Created a series of free Lunch and Learn safety webinars for member firms.

### Safety Awards

Safety achievement awards were presented in May of 2013 at the MBMA's Spring Meeting. Forty-five manufacturing facilities submitted data for the OSHA Injury Statistics safety award program. Fifty-four safety awards were presented with some facilities winning multiple awards. 17 individual plants won Superior Overall Safety Record awards, 33 plants won Improved Safety awards for lowering injury frequency rates by at least 20%, and 4 plant locations received Safety awards for No Recordable Cases in 2011.

### 2014 Initiatives

- The 5th annual Safety Committee meeting will take place in Dallas, TX in May of 2014. The committee will reach out to each MBMA member company to send designated safety representatives, front line management and plant safety personnel.
- Safety webinars will be developed on specific relevant safety topics.
- Active participation of Associate Members' safety representatives will

be solicited to gain different views and ideas on safety related issues.

- We look forward to redesigning the MBMA Safety website to make it even more user-friendly.
- We intend to review the safety award achievement program and revise the eligibility criteria.



## TECHNICAL COMMITTEE

Jerry Hatch, Chairman

### Technical Committee Mission

The MBMA Technical Committee engages in research projects in coordination with national research universities and oversees the publication of MBMA manuals and guides.



In 2013, the committee made proposals for code revisions as well as the projects detailed below.

### Studying Seismic Behavior of Metal Buildings Leads to Code Changes and Validates System Designs

In 2013, the committee summarized the lessons learned from shake table and component testing, quantifying the observed behaviors and developing a proposed design procedure. This project advocates for building codes with more appropriate seismic-design methods for tapered-member rigid frames. This will make metal buildings more accepted in high seismic areas and documents their excellent performance in handling earthquake loads.

Multiple research projects were generated to aid in quantifying the behavior of tapered-member rigid frames; (natural period study, mezzanine study, LTB Study, Patterned Vertical Seismic Loads, Column Base

Stiffness study, effective length for moment calculations study, Compression Flange Study). Some of these studies will support independent code changes in favor of tapered-member rigid frames. The others will support our overall approach to the seismic design of frames.

In 2014, we will continue to substantiate tapered-member frame strength and stiffness with FEMA methodology. The complexity of this work is centered around the quantification of the strength and stiffness cyclic degradation behavior for tapered-member frames with thin elements and its effect on seismic response. This has been a new, very large, area of study for MBMA and we have enlisted the assistance of a PEER committee of leading seismic researchers and practitioners. A brainstorming session occurred in November 2013 where 20 researchers, consultants, and MBMA representatives discussed recent research and the best ways to use it.

### Study Leads to New Design Procedures to Accommodate Wind Loads on Overhead Doors

Our study of the behavior of overhead metal doors has been underway for several years in coordination with DASMA, the Door and Access Systems Manufacturers Association. In 2013, the work of researchers at Virginia Tech culminated with a design procedure that considers the flexibility of the door jambs and the serviceability requirements of the roll-up door. We are evaluating this





design procedure and soliciting input from door manufacturers before it is finalized.

### **Study of the Shear Strength of Tapered Members May Result in Economies**

Research by Brad Davis, Ph.D, at the University of Kentucky, confirms that some equations in the current code for tapered members shear strength are overly conservative. We are working with Dr. Davis to create experimental justification for removing some of the conservativeness in the code equations. The tests will be on prismatic members. These results will then be easily translated to tapered members. We anticipate that the research will result in economies for deep slender webs which would benefit the metal building industry.

### **Analysis-Based Design to Reduce MBS Costs**

We are funding a project with Dr. Cris Moen at Virginia Institute of Technology to develop an analysis-based design approach for metal building wall and roof systems that will improve industry competitiveness by reducing the need for costly experiments that currently define capacity limits in AISI-S100-07 Section D6.1. The proposed approach using the direct strength method permitted in AISI S100 can accommodate new

products and will encourage a fresh look at the efficiency of existing wall and roof systems.

### **Snow Loads on Roofs with Solar Panels**

In 2013, MBMA helped support research by Dr. Michael O'Rourke of Rensselaer Polytechnic Institute (RPI) who developed ASCE 7-consistent guidelines for snow loads atop solar-paneled roofs. The research provides snow load models for solar panels that are flush, tilted-closed, tilted-open and elevated. Recommendations also consider the thermal factor, slope factor, exposure factor, sliding snow and drifting snow loading for each solar panel configuration. With more solar panel installations being utilized on metal buildings, this research will help define the proper snow loads for these unique roof situations.

### **Snow Load Maps**

Both Western and Eastern snow loads are problematic due to large undefined areas and inconsistent statistical methods used by Western U.S. states. Statistically based ground snow maps are necessary to ensure uniform reliability for snow load design across the U.S. A new map needs to be developed and digitized for online lookup on the Applied Technology Council (ATC) website so that practicing engineers can enter

a address or zip code for a project and get more reliable snow load data than trying to manually find the site on a small scale map. Dr. O'Rourke is working with the U. S. Army's Cold Regions Research and Engineering Laboratory (CRREL) to complete the Eastern states and Dr. Sack of the University of Idaho is trying to solicit funding from NSF to complete the Western states. Additional funding is needed to complete the study and sponsor the ATC website development. MBMA is supporting this effort by leading the coordination of the various universities, state and federal government agencies to carry out this project and helping to locate resources to make it happen. The successful completion of this project will provide more accurate and complete snow loads by location, available through online query.

### **Flange Brace Research**

This research determines flange-brace strength and stiffness requirements that preclude stability buckling of tapered member frames. Dr. Don White of Georgia Institute of Technology has studied flange-brace strength and stiffness requirements for several years under MBMA sponsored research and demonstrated that the strength and stiffness requirements used in metal building systems are different than those developed for conventional steel construction. Given the importance of flange braces in maintaining the strength and stability of the primary frames

in a metal building it is imperative that they are designed appropriately as well as economically. The final step that is underway is the development of a flange-brace tool that will allow metal building manufacturers to generate rules for the strength and stiffness requirements of flange braces that will ultimately interface with production design programs.

### **Column Base Rotational Testing Shows Design Impact**

Recent lateral drift measurement of a metal building and seismic behavior testing has shown that frame base stiffness has a larger-than-anticipated impact on design. Dr. Finley Charney at Virginia Institute of Technology developed a base plate wizard that can be used to determine the stiffness of frame base plates in metal building systems. Dr. Bora Gencturk at the University of Houston has submitted a proposal at the request of MBMA to experimentally test column bases to confirm stiffness predictions of the Base Plate Wizard and observe strength and cyclic degradation behavior of column bases including anchor rods formed in concrete. This would be a new 2014 project, dependent on the outcome of budget requests.

### **Combined Nodal and Relative Bracing**

AISC 360 Specification lists two distinct types of bracing for columns and beams: a) relative bracing, where member strength relies on the shear strength and stiffness

of the panel it is attached to, and b) nodal bracing where bracing is provided by external elements at the point of bracing (lateral rods, torsional flange braces, etc.).

The combination of two bracing options is more than the sum of the two; however, the effect is commonly ignored in design since there is no code guidance. MBMA has proposed funding a research project for 2014 that would focus on developing a design procedure for combining relative and nodal bracing, mainly for beams.

### **Resources: A New Inspection Handbook – Coming Soon!**

The committee is reviewing and revising several publications in 2013 in coordination with other MBMA committees. A Metal Building Systems Inspection Handbook is being prepared for completion in 2014. The guide will be extremely useful for individuals responsible for tasks related to the design, construction and occupancy of a metal building project. The handbook will include codes and standards as well as common industry practices.

The AISC/MBMA Design Guide 25 for the design of tapered member frames, has been recognized as a great step forward in how the AISC 360 Specification that deals with uniform members can be properly applied to tapered members. However there are limitations that prohibit the industry from fully embracing it. Some of these limitations have been addressed



in recent seismic research and just need to be fully vetted and incorporated into the guide. Other limitations to address include material strength, hybrid sections, approximate methods to determine the lateral torsional buckling resistance of a general stepped and multiple-tapered member. The plan would be to

have Dr. White of Georgia Institute of Technology and the co-author of Design Guide 25 make recommendations that would be included in an updated revision or addendum.





## ACCREDITATION COMMITTEE

Chuck Haslebacher,  
Chairman

### Accreditation Committee Mission

**MBMA's Accreditation Committee serves as the expert advocate for the industry and works with IAS to achieve solutions that meet the needs of IAS and the metal building systems industry.**



MBMA Technical Accreditation Advisory Council met with IAS and accredited inspection agencies on AC472 to review the program and recommend improvements. The council conducted a survey of all board members to receive comments, questions, issues, and ideas related to the AC472 program. There was special attention on internal audits and management reviews to oversee the effectiveness of the program within the company's operation. New programs and

changes are always being considered to advance quality assurance programs.

All MBMA Building System Member companies are accredited in accordance with the International Accreditation Service (IAS) AC472, the IAS Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems. AC472 is the most comprehensive quality-assurance accreditation program of its kind and is designed specifically for manufacturers of metal building systems.

AC472 addresses quality management system elements such as:

- personnel requirements;
- product traceability;
- process control; and
- various administrative and technical requirements that are essential for code officials to deem IAS-accredited entities as approved fabricators.

This comprehensive accreditation program for the inspection of metal buildings is based on the requirements of Chapter 17 of the International Building Code® and provides code officials with a means to approve the inspection programs of manufacturers involved in the fabrication of metal building systems.



# VISION, VALUE, VERIFICATION

... MBMA HELPS THE INDUSTRY SUCCEED.

# EDUCATIONAL AND TECHNICAL RESOURCES



## **MBMA EDUCATIONAL AND TECHNICAL RESOURCES PROVIDE VALUABLE INFORMATION FOR THE INDUSTRY**

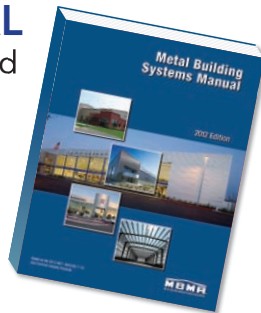
MBMA continues to lead the metal building systems industry and fulfill its mission by providing educational, research and technical resources. These include an increasing number of design guides and manuals that are invaluable for anyone who works with metal buildings anywhere in the world. As new information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

## MBMA WEBINARS

MBMA developed two webinars that were successfully introduced in the fall of 2011. The Energy Committee developed the Energy Code Compliance for Metal Building Systems webinar while the Committee on Fire Protection and Related Insurance Matters instituted the Fire Code Compliance for Metal Building Systems webinar. These two webinars target member companies, builders, code officials, contractors, architects and designers of metal buildings. Both will continue in 2014. Details are available at [www.mbma.com/bookstore](http://www.mbma.com/bookstore).

## 2012 METAL BUILDING SYSTEMS MANUAL

- Nationally recognized reference manual; the primary resource 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 AutoCAD details
- Includes the 2012 International Building Code and the American Society of Civil Engineers/Structural Engineering Institute (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 holds time-saving AutoCAD roofing details



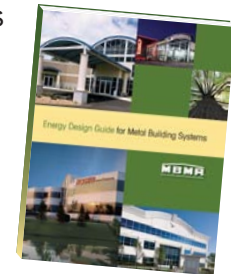
## FIRE RESISTANCE DESIGN GUIDE FOR METAL BUILDING SYSTEMS

- Addresses fire protection issues related to metal building systems
- Provides 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 tool for designing and erecting energy-efficient buildings of all kinds
- Includes details on a variety of state energy codes, standards, and compliance tools
- Provides information on cool roofs and a



MBMA IS **WORKING** ON THE **FUTURE TODAY.**

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 concrete masonry hardwalls on metal buildings
- It 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

- Resource to help engineers, building officials and plan checkers ensure that designs are compliant with the requirements of the 2006 International Building Code® (IBC®)

- 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





# MBMA MEMBERS

## MBMA MEMBERS

A & S Building Systems Inc.  
An NCI Company  
Caryville, TN  
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ACI Building Systems, Inc.  
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[www.acibuildingsystems.com](http://www.acibuildingsystems.com)

All American Systems  
Houston, TX  
[www.allamericansys.com](http://www.allamericansys.com)

Alliance Steel Inc.  
Oklahoma City, OK  
[www.allianceokc.com](http://www.allianceokc.com)

American Buildings Co.  
A Nucor Company  
Eufaula, AL  
[www.americanbuildings.com](http://www.americanbuildings.com)

BC Steel Buildings, Inc.  
Oklahoma City, OK  
[www.bcsteel.com](http://www.bcsteel.com)

Behlen Building Systems  
Columbus, NE  
[www.behlenmfg.com](http://www.behlenmfg.com)

Bigbee Steel Buildings, Inc.  
Muscle Shoals, AL  
[www.bigbee.com](http://www.bigbee.com)

BlueScope Buildings North America,  
Inc.  
Kansas City, MO  
[www.bluescopesteel.com](http://www.bluescopesteel.com)

Butler Manufacturing  
A Division of BlueScope Buildings North  
America, Inc.  
Kansas City, MO  
[www.butlermfg.com](http://www.butlermfg.com)

CBC Steel Buildings  
A Nucor Company  
Lathrop, CA  
[www.cbcsteelbuildings.com](http://www.cbcsteelbuildings.com)

Ceco Building Systems  
An NCI Company  
Columbus, MS  
[www.cecobuildings.com](http://www.cecobuildings.com)

Chief Buildings  
Grand Island, NE  
[www.chiefbuildings.com](http://www.chiefbuildings.com)

Dean Steel Buildings, Inc.  
Fort Myers, FL  
[www.deansteelbuildings.com](http://www.deansteelbuildings.com)

Garco Building Systems, Inc.  
An NCI Company  
Airway Heights, WA  
[www.garcobuildings.com](http://www.garcobuildings.com)

Golden Giant, Inc.  
Kenton, OH  
[www.goldengiant.com](http://www.goldengiant.com)

Gulf States Manufacturers  
A Nucor Company  
Starkville, MS  
[www.gulfstatesmanufacturers.com](http://www.gulfstatesmanufacturers.com)

Heritage Building Systems  
An NCI Company  
North Little Rock, AR  
[www.heritagebuildings.com](http://www.heritagebuildings.com)

Inland Buildings  
Cullman, AL  
[www.inlandbuildings.com](http://www.inlandbuildings.com)

Kirby Building Systems, Inc.  
A Nucor Company  
Portland, TN  
[www.kirbybuildingsystems.com](http://www.kirbybuildingsystems.com)

Ludwig Buildings Enterprises, LLC  
Harahan, LA  
[www.ludwigbuildingsenterprises.com](http://www.ludwigbuildingsenterprises.com)

Mesco Building Solutions  
An NCI Company  
Irving, TX  
[www.mescobuildingsolutions.com](http://www.mescobuildingsolutions.com)

Metallic Building Company  
An NCI Company  
Houston, TX  
[www.metallic.com](http://www.metallic.com)

Mid-West Steel Buildings  
An NCI Company  
Houston, TX  
[www.mid-weststeel.com](http://www.mid-weststeel.com)

NCI Building Systems, Inc.  
Houston, TX  
[www.ncilp.com](http://www.ncilp.com)

Nucor Building Systems  
A Nucor Company  
Waterloo, IN  
[www.nucorbuildingsystems.com](http://www.nucorbuildingsystems.com)

Oakland Metal Buildings, Inc.  
Florence, AL  
[www.oaklandmetalbldgs.com](http://www.oaklandmetalbldgs.com)

Pinnacle Structures, Inc.  
Cabot, AR  
[www.pinnaclestructures.com](http://www.pinnaclestructures.com)

Red Dot Buildings  
Athens, TX  
[www.reddotbuildings.com](http://www.reddotbuildings.com)

Robertson Building Systems  
An NCI Company  
Ancaster, Ontario, Canada  
[www.robertsonbuildings.com](http://www.robertsonbuildings.com)

Ruffin Building Systems, Inc.  
Oak Grove, LA  
[www.ruffinbuildingsystems.com](http://www.ruffinbuildingsystems.com)

Schulte Building Systems, Inc.  
Hockley, TX  
[www.sbslp.com](http://www.sbslp.com)

Spirco Manufacturing  
Memphis, TN  
[www.spirco.com](http://www.spirco.com)

Star Building Systems  
An NCI Company  
Oklahoma City, OK  
[www.starbuildings.com](http://www.starbuildings.com)

Steel Built Corp.  
Ambridge, PA  
[www.olympiabuildings.com](http://www.olympiabuildings.com)

Steel Systems  
Houston, TX  
[www.steelssys.com](http://www.steelssys.com)

Trident Building Systems, Inc.  
Sarasota, FL  
[www.tridentbuildingsystems.com](http://www.tridentbuildingsystems.com)

Tyler Building Systems, L.P.  
Tyler, TX  
[www.tylerbuilding.com](http://www.tylerbuilding.com)

United Structures of America, Inc.  
Houston, TX  
[www.usabldg.com](http://www.usabldg.com)

Varco Pruden Buildings  
A Division of BlueScope Buildings  
North America, Inc.  
Memphis, TN  
[www.vp.com](http://www.vp.com)

Vulcan Steel Structures, Inc.  
Adel, GA  
[www.vulcansteel.com](http://www.vulcansteel.com)

Whirlwind Steel Buildings, Inc.  
Houston, TX  
[www.whirlwindsteel.com](http://www.whirlwindsteel.com)

# MBMA ASSOCIATE MEMBERS

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Diamond Door Products, LTD.  
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Dow Chemical  
Expi-Door Systems Inc.  
Gerda  
Glasteel/Stabilit America, Inc.  
Guardian Building Products, Inc.  
ITW Metal Building Solutions  
Lamtec Corporation  
Lincoln Electric Company  
Metal Building Software, Inc.  
Metallic Products Corporation  
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New Millennium Building Systems, LLC

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Palram Americas Inc.  
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Precoat Metals  
Preformed Line Products  
Roof Curb Systems, Inc.  
S-5! Attachment Solutions  
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Valspar  
Worthington Steel Company





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