Metal Buildings M&V

2014 Building Technologies Office Peer Review

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

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Project Summary

Timeline:

Start date: Oct 2012

Planned end date: Sept 2015

Key Milestones:

Research Roadmap, July 2013

Air Leakage Study, Feb 2014

Retrofit Experiment, Sept 2014

Budget:

Total DOE $ to date: $425K

Total future DOE $: $225K

Key Partner:

MBMA
METAL BUILDING MANUFACTURERS ASSOCIATION®

Project Goal:

Through close collaboration with metal building industry leaders, increase energy efficiency in new and existing metal buildings in a cost effective manner.

Target Market/Audience:

Metal building designers, fabricators, installers and owners.

Purpose and Objectives

Problem Statement: The primary goal of this project is to increase energy efficiency in new and existing metal buildings through research into areas specifically targeted by metal building industry leaders.

The project seeks to:

- Identify design, installation, operation challenges
- Identify and demonstrate solutions
- Educate stakeholders via data sources specific to industry

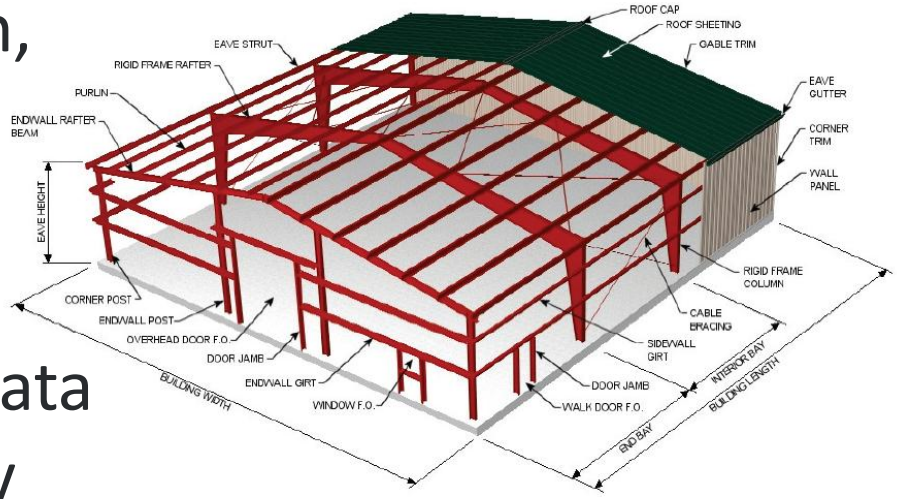


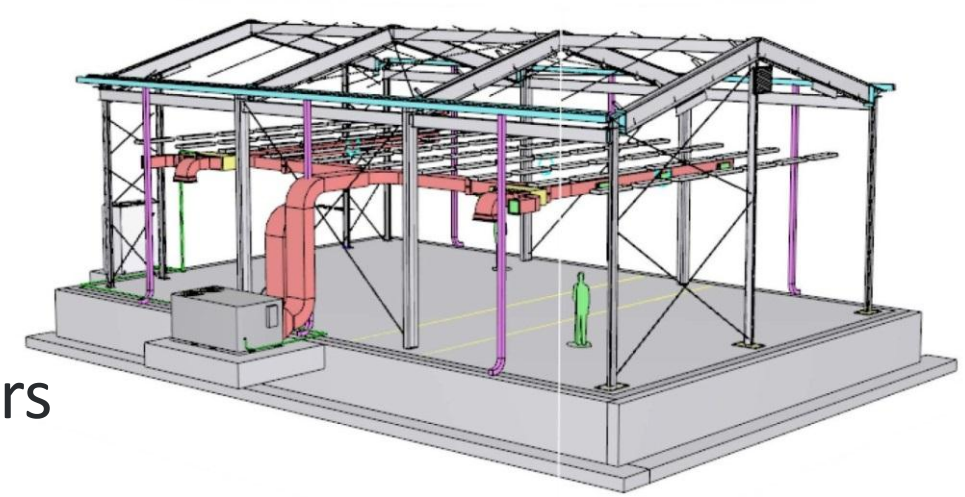
Image Courtesy MBMA

Purpose and Objectives

Target Market: Approximately 3.4 Quad. Over multiple decades, metal buildings consistently comprise 40+% of new low-rise non-residential construction.

Audience: Metal Building Stakeholders

- Designers
- Fabricators
- Installers
- Owners
- Allied industry partners



Purpose and Objectives

Impact of Project:

Final Products:

- Demonstrate multiple energy efficiency measures that the industry can implement
- Provide literature and training to industry stakeholders for best practices to implementation

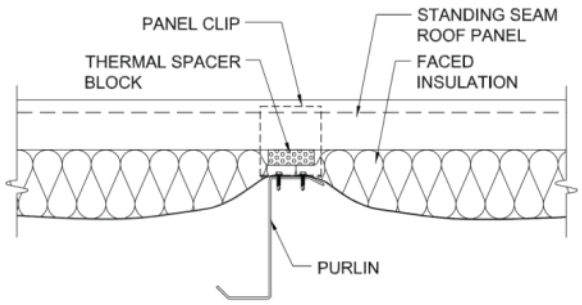
Path

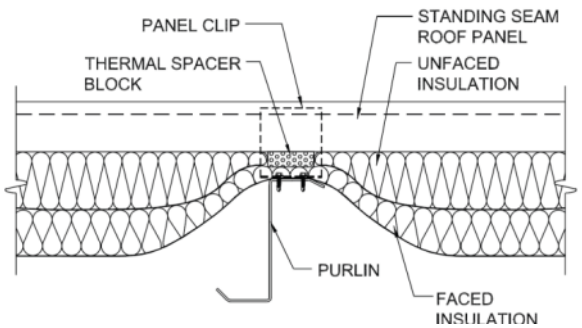
- FY13-FY16: Industry issues prioritized with paths to address those; new best practices published; business case for more efficient metal buildings
- FY16-FY18: Best practices are adopted as standard
- FY18-…: Industry standards revised

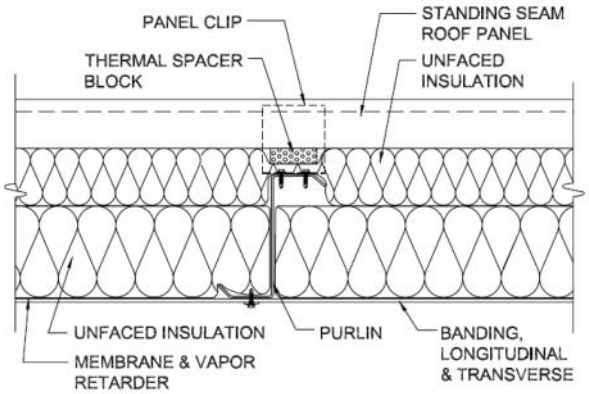
Approach

Approach:

- Work closely with industry leaders to identify those efficiency challenges that are unique to their industry and not currently being addressed by other energy efficiency efforts.
- Seek to identify solution sets that would be available to most industry stakeholders.







Images Courtesy MBMA

Approach

Key Issues:

- Industry Association Standards
- First Cost versus Best Value
- Energy codes/standards
- Many metal buildings are small (<10,000 SF)

Approach

Distinctive Characteristics:

- Work with industry experts to focus on areas where codes/standards haven't translated well to current metal building construction.
- Industry association provides linkage to allied manufacturers that may be able to adapt products/methods for better use in metal buildings.

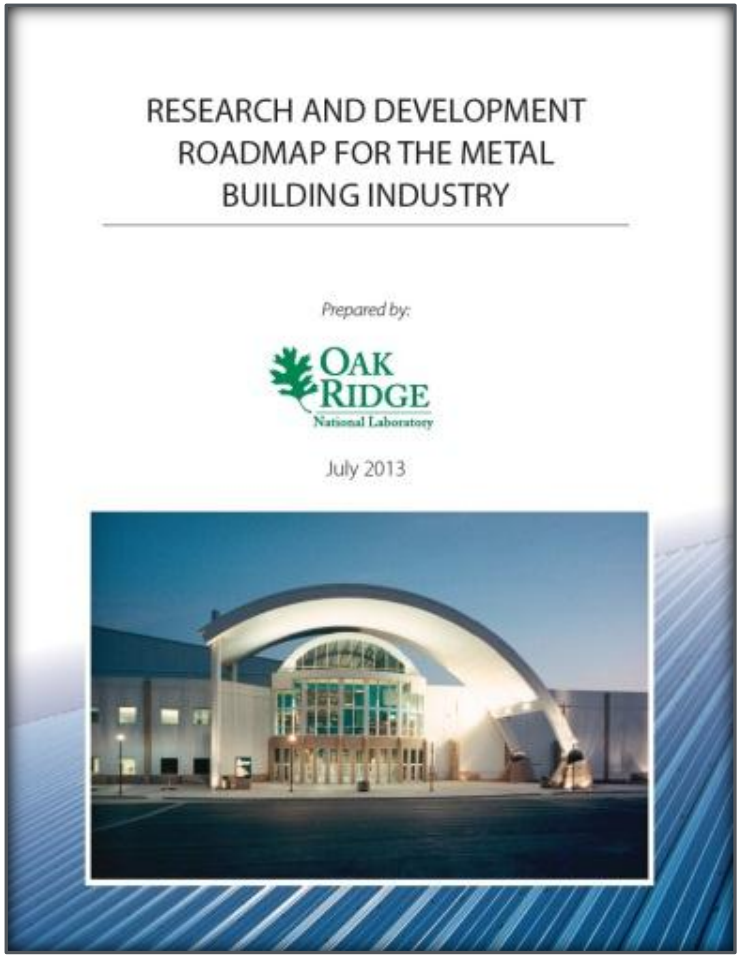
- Unique ORNL research building designed and constructed with industry support

Progress and Accomplishments

Lessons Learned: Industry association reviews/input require significant lead times.

Accomplishments:

- Developed a 5-year research roadmap for MBMA.
- Collaborated with MBMA during the design and installation of a functional metal building.
- Collected baseline data on the research building.
- Delivered a metal building commissioning webinar.
- Completed air leakage study.



Progress and Accomplishments

Market Impact (Recent Activities):

Mar 13: Project featured in Structural Engineer

Oct 13: Metal building energy efficiency research workshop (31 attendees from 21 companies)

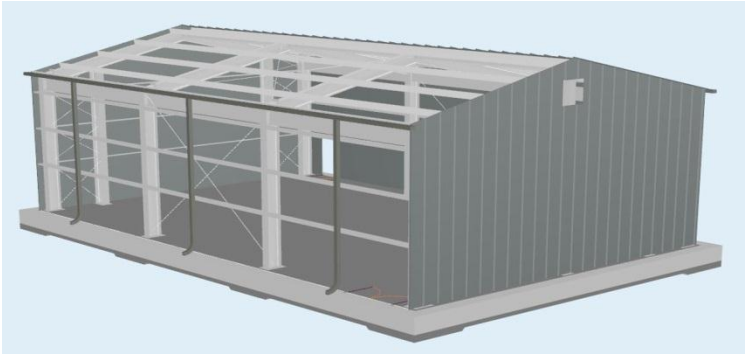
Dec 13: 102 participants for metal building commissioning webinar

Project Integration and Collaboration

Project Integration:
ORNL works directly with MBMA senior engineering staff to coordinate activities with MBMA committees and MBMA member companies.

Partner:
MBMA

- Director of Research
- Board
- Executive Committee
- MBMA Energy Committee
- Sustainability Committee
- Code Action Committee



Project Integration and Collaboration

Communications:

- Workshop 11/12
- Structural Engineer magazine 3/13
- Roadmap 7/13
- Workshop, Atlanta 10/13
- Webinar 12/13

The efficiency quest

March 2013 » Features » STEEL

New research explores energy saving opportunities in metal building systems

Dan Walker, P.E.

The skeletal framing for the low-rise FRP building.

Next Steps and Future Plans

FY14:

- Next experiment on research building
- Planning for retrofit

FY15:

- Deployment case – develop business case/model, address installer issues
- Install envelope retrofit on research building

Reference Slides

Participants:

- A&S Building Systems
- American Buildings
- Architectural Testing
- Atlas Bolt & Screw
- Behlen Manufacturing
- Butler Manufacturing
- Building Research Systems
- Kirby Building Systems
- DOW
- Lamtec
- Schulte Building Systems
- Bigbee Steel
- Chief Buildings
- Ludwig Building
- NCI
- Nucor
- Palram Americas
- Precoat Metals
- Triangle Fastener
- Varco Pruden
- Worthington Steel

Project Budget

Project Budget: $425K to date
Variances: $49K was carried over from FY13 to FY14
Cost to Date: $268K
Additional Funding: Approx $20K additional outside industry cost share for HVAC equipment on research building.

Budget History					
FY2013 (past)		FY2014 (current)		FY2015 (planned)	
DOE	Cost-share	DOE	Cost-share	DOE	Cost-share
$207K	$65K	$218K	$130K	$225 (est)	$75K

Project Plan and Schedule

Notes:

- FY14 Q1 Webinar was not presented in Oct due to DOE moratorium on electronic communications during the federal government shutdown. The webinar was rescheduled and delivered in Dec.
- FY14 Q3 – Upcoming Go/No-Go Decision related to insulation retrofit.