

Building Information Modeling for Masonry (BIM-M)

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Vice President Engineering Services



Acknowledgements

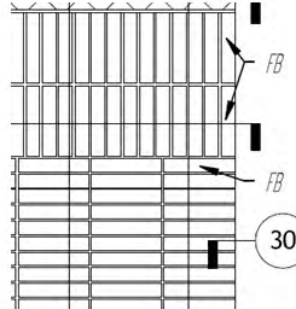
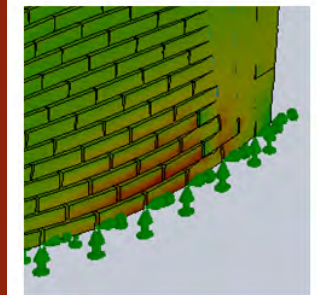
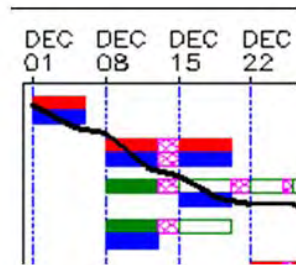
Much of the information and images in this presentation are from a BIMM presentation given in Sept. 2012 by:

David Biggs, PE, SE, Hon TMS

- Biggs Consulting Engineering
- (BIM-M Masonry Industry Coordinator)

Russell Gentry, PE

- Georgia Inst. of Technology
- College of Architecture
- Digital Building Laboratory
- (BIM-M Project Manager)





Promote

Design

Analyze

Detail

Estimate

Procure

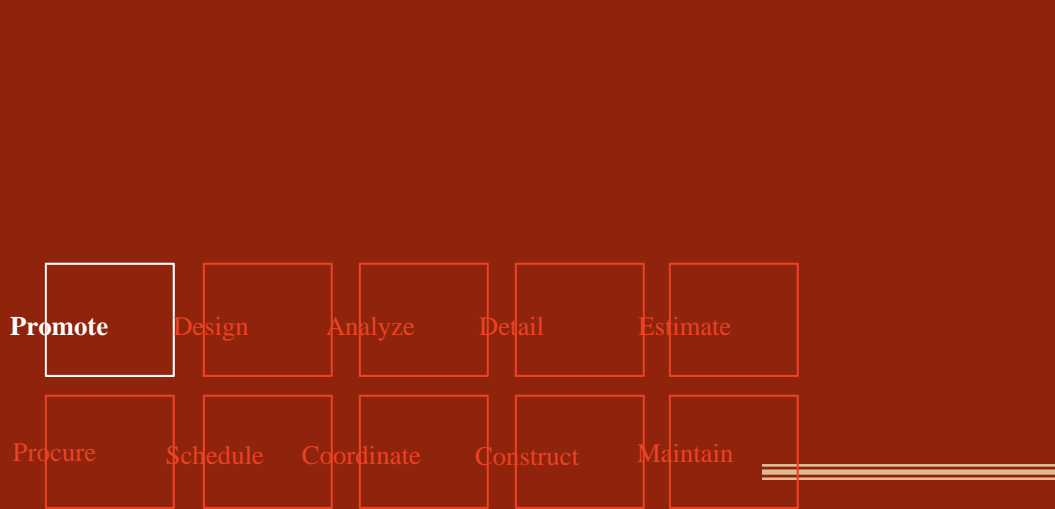
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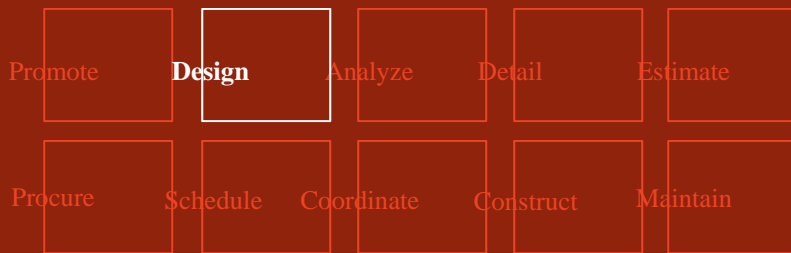
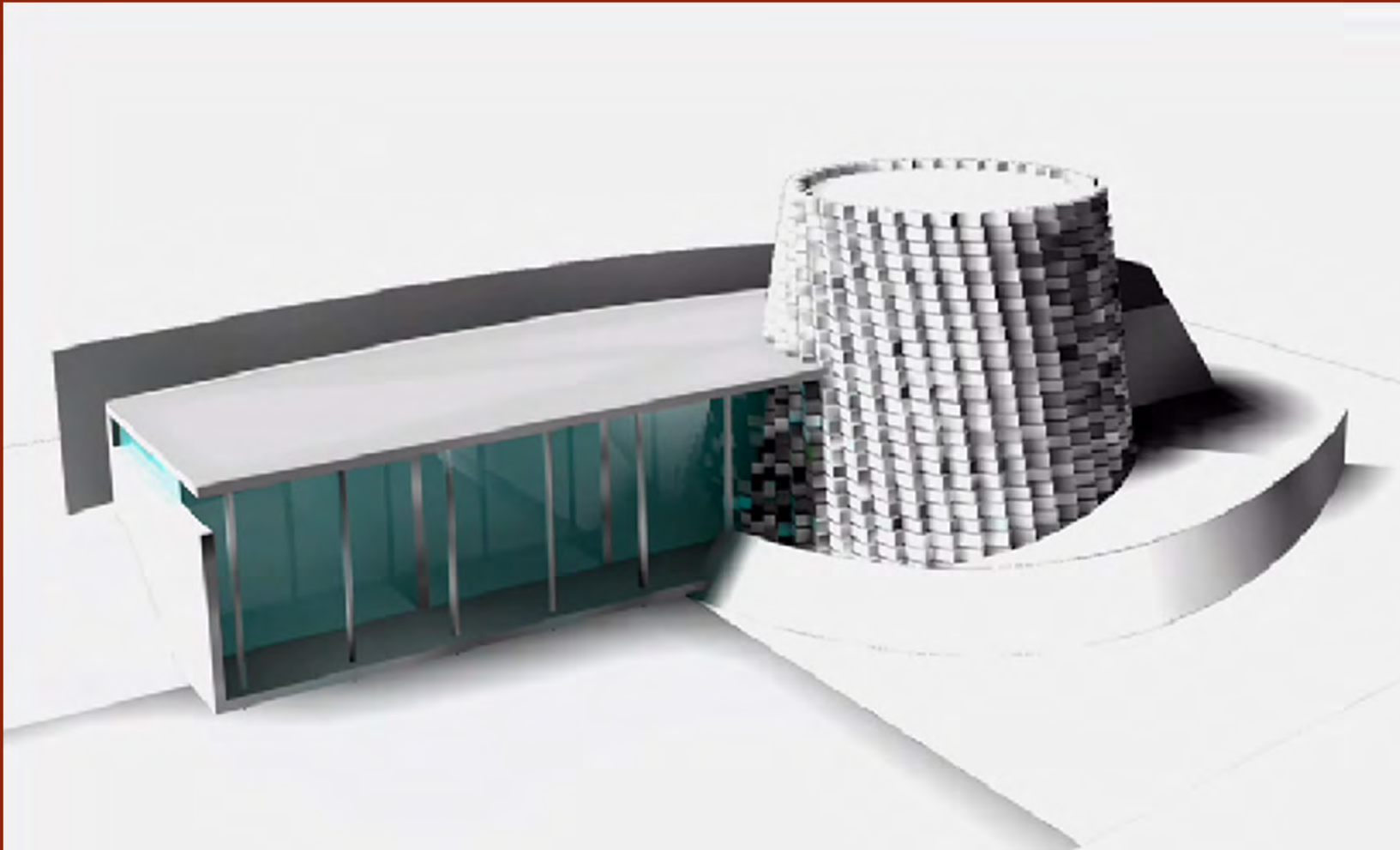
Coordinate

Construct

Maintain

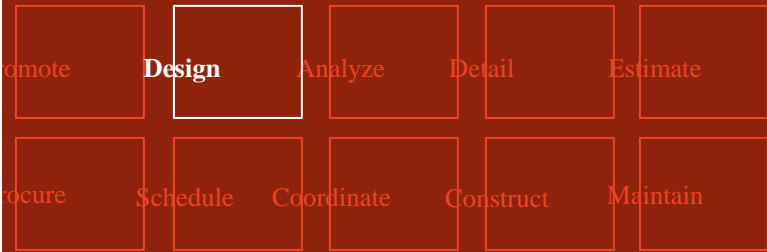


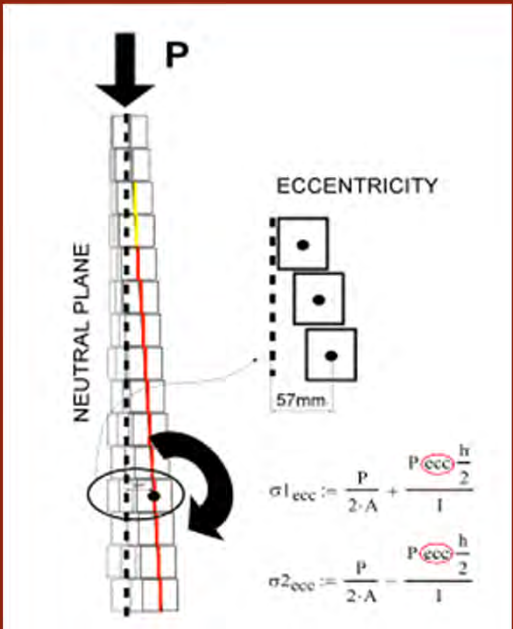
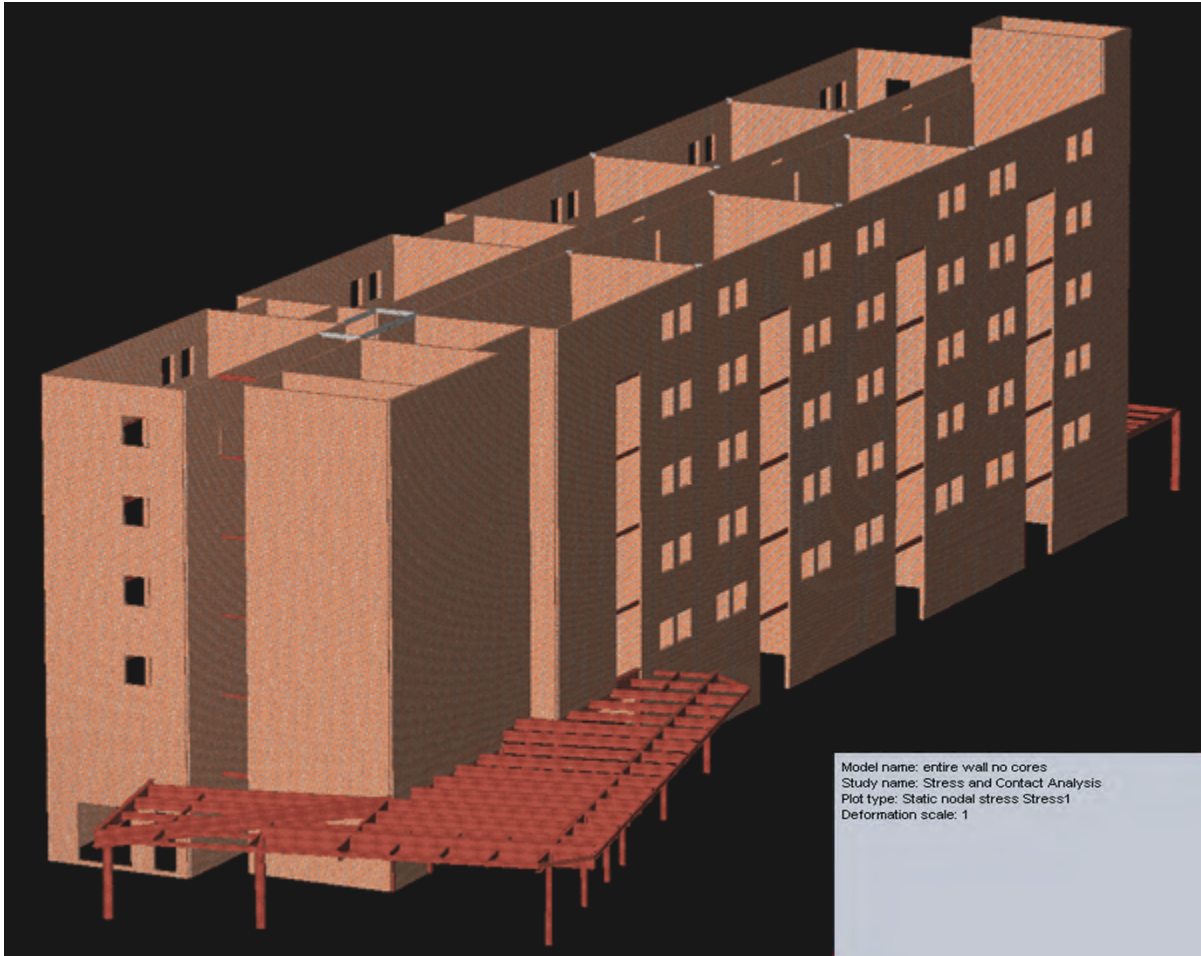




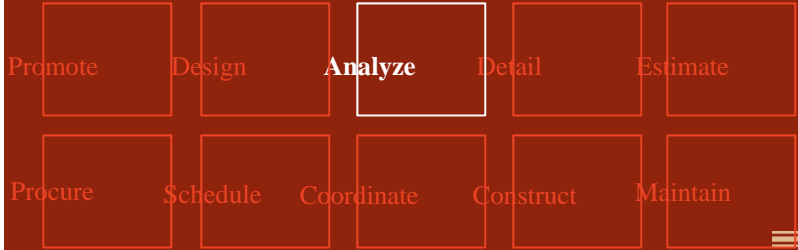
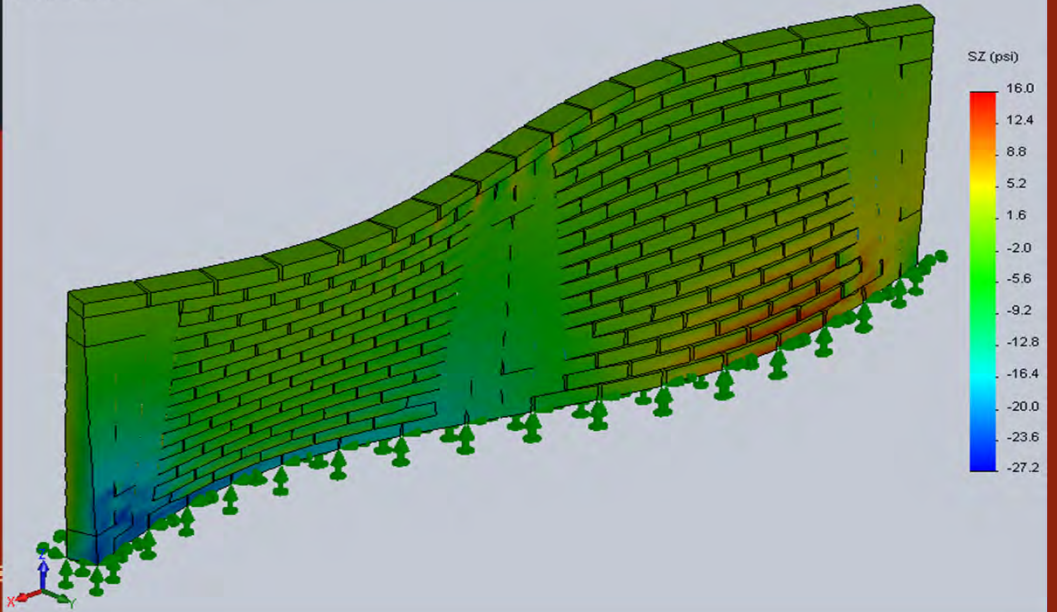


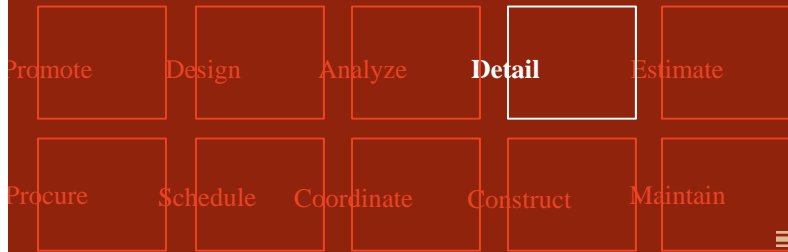
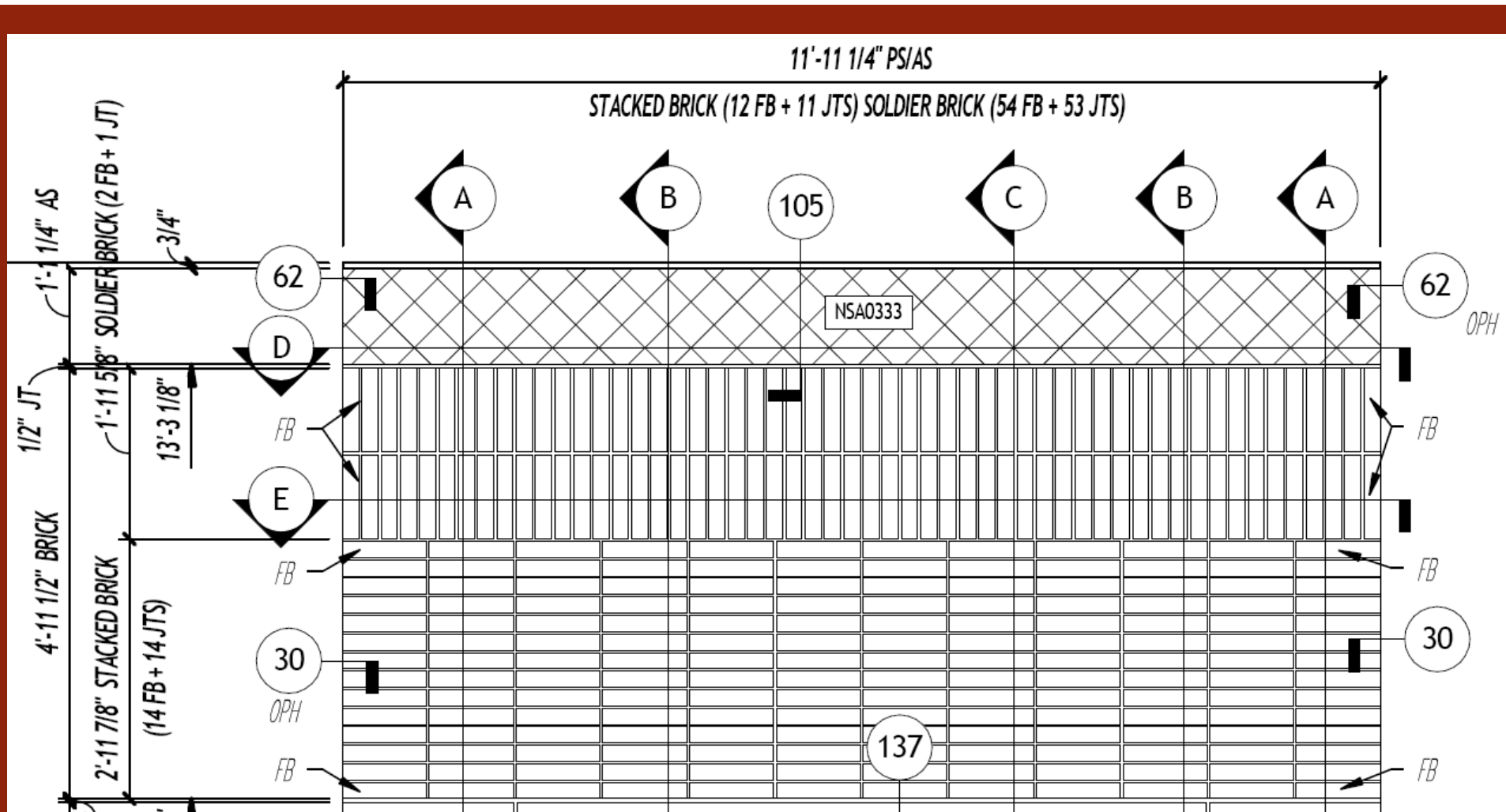
Conner Carry © 2011

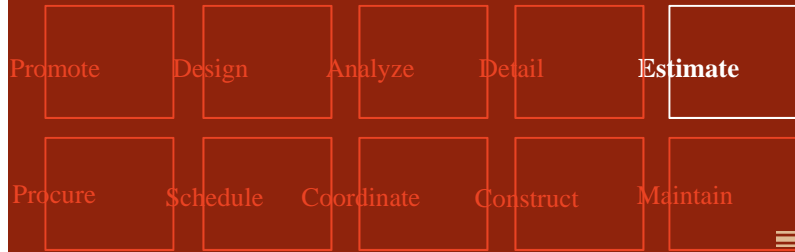
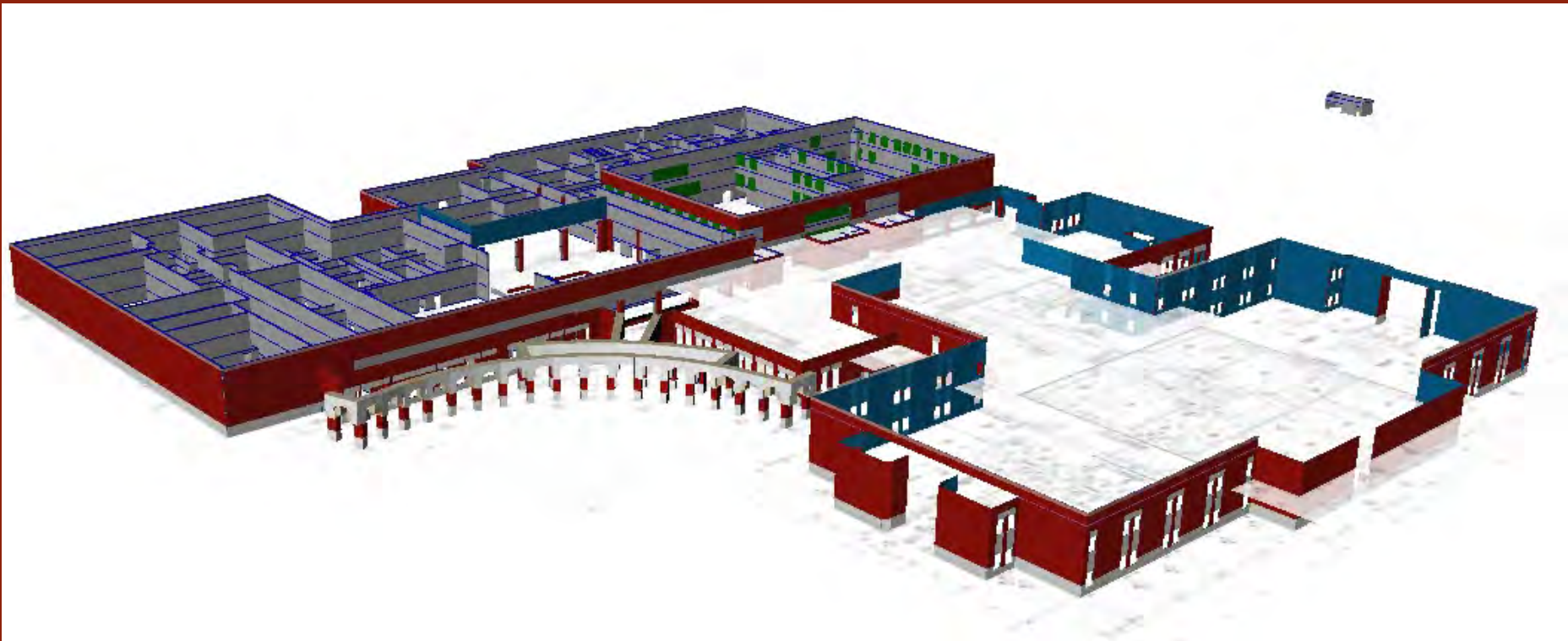




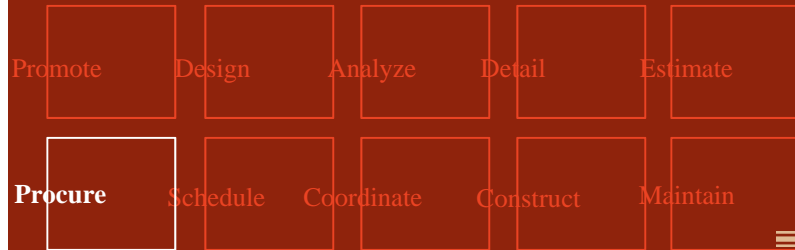
Model name: entire wall no cores
 Study name: Stress and Contact Analysis
 Plot type: Static nodal stress Stress1
 Deformation scale: 1







Material [U325SA] Totals		465 Pieces	150.500
U325SB	Utility Soldier B Color		SqFt
A	Ext Col A	28 Pieces	9.000
C	Col 23 F.5 to N 3 story Classr	278 Pieces	90.000
B	Alcove B127a N Band Rm	56 Pieces	18.083
B	E6 between 12.3 & 17 South Wal	93 Pieces	30.000
B	H7 between 6 & 6.8 N Ext Wall	62 Pieces	20.000
B	West Wall Vest B123 with Insul	23 Pieces	7.500
B	West Wall Vest B123 NO Insul	58 Pieces	18.667
B	East Wall Vest B123 NO Insul	59 Pieces	19.000
B	N Wall Top of Main ent.	136 Pieces	44.000
B	N Wall Top of Main ent.	184 Pieces	59.667
B	N Wall Office B13 & 140	41 Pieces	13.333
B	N Wall Confere B138 with Insul	93 Pieces	30.000
B	H10 between 6.9 & 9	21 Pieces	6.667
B	East Wall Vest B123 with Insul	10 Pieces	3.333
B	E6 between 12???????????	124 Pieces	40.000
Material [U325SB] Totals		1,265 Pieces	409.250
Class Totals BRICKS		77,865 Pieces	24,961.560





Promote

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Analyze

Detail

Estimate

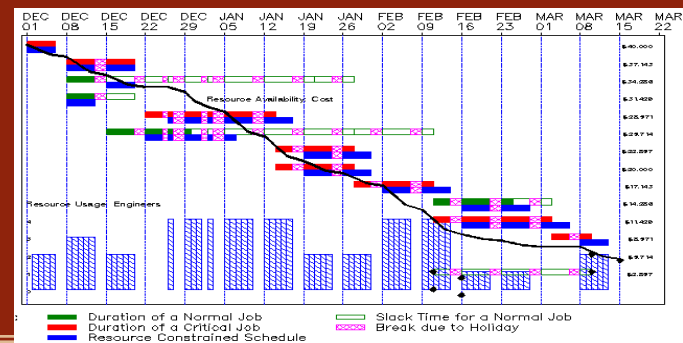
Procure

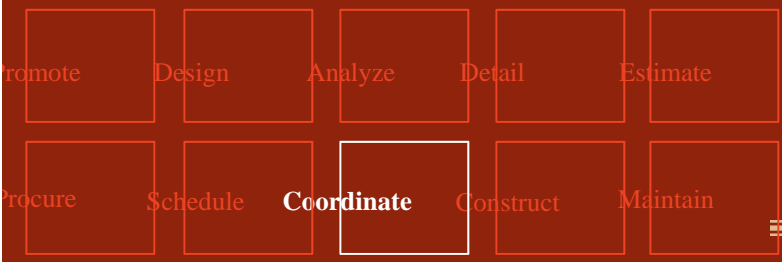
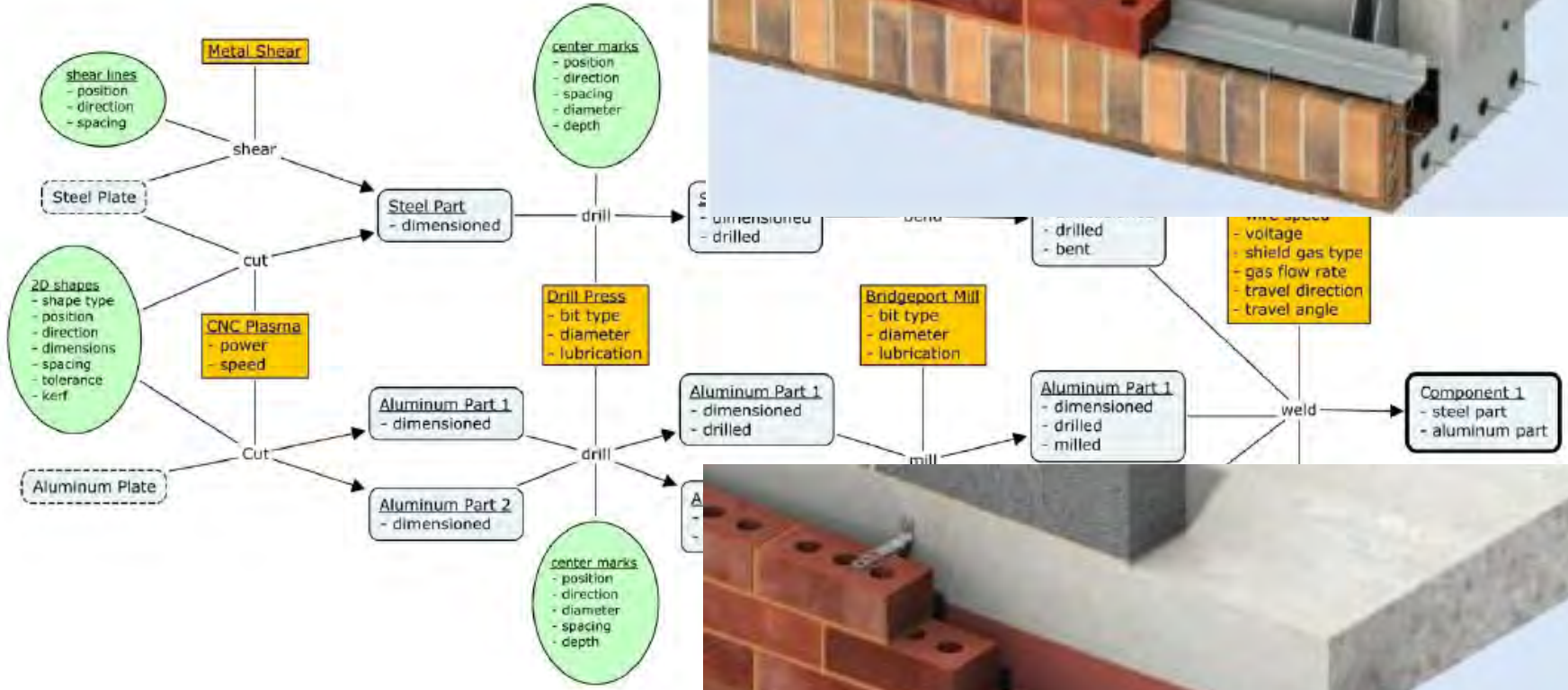
Schedule

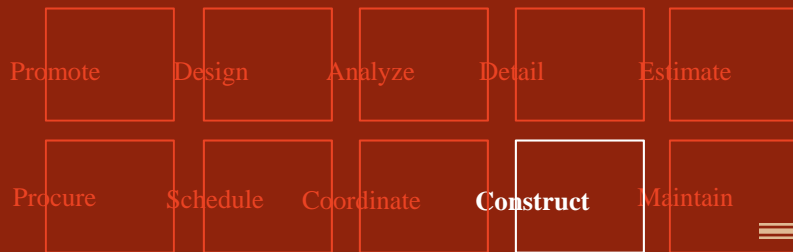
Coordinate

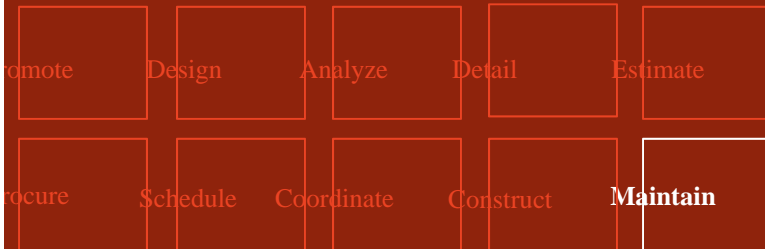
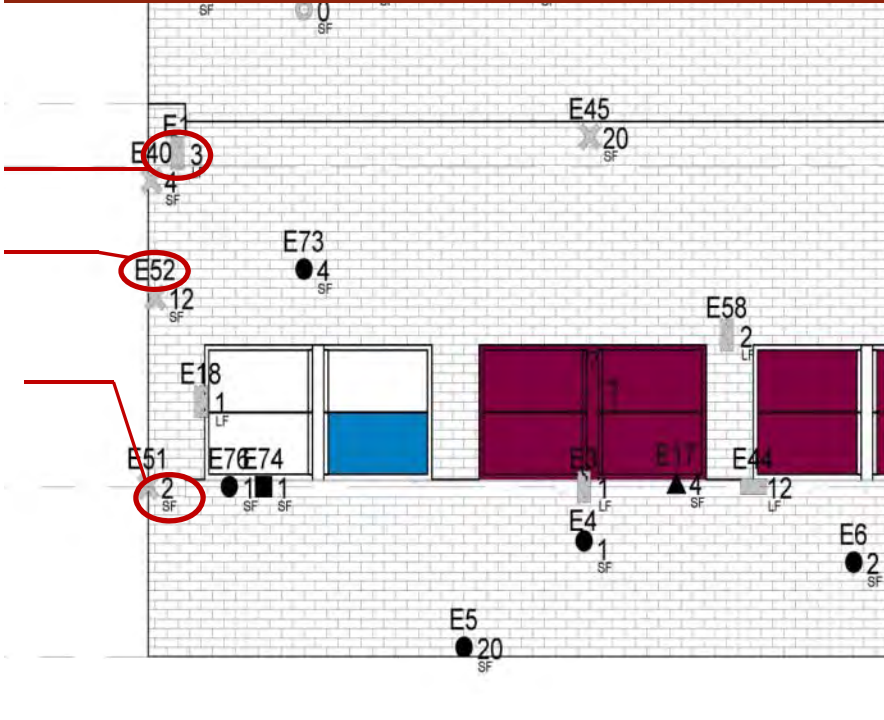
Construct

Maintain





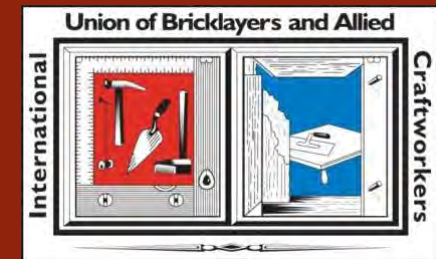
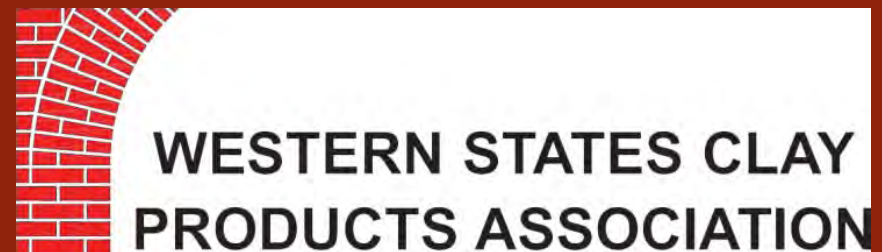




Mission

To unify the masonry industry and all supporting industries through the development and implementation of BIM for Masonry (BIM-M) software to facilitate smoother workflows and collaboration across all disciplines from owner, architect, engineer, manufacturer, mason, contractor, construction manager, and maintenance professionals.

Sponsoring Organizations



Affiliated Groups

- Portland Cement Association
- Cast Stone Institute
- Marble Institute of America
- Tile Contractors Association of America
- Cold Spring Granite
- Interstate Brick
- Indiana Limestone Institute
- Masonry Institute of St. Louis
- Masonry Institute of Michigan
- Masonry Institute of America
- Northwest Concrete Masonry Association
- Concrete Masonry Association of California and Nevada



Phases

Phase I: Roadmap

- Sponsors, Workgroups, Schedule
- Jan. 2012 – Jan. 2013

Phase II: Development

- Model Units & Walls, Contractor Input
- Jun. 2013 – Dec. 2014

Phase III: Specification

- Spec, Structural Engineering, Contractor Input
- Jan. 2015 – Apr. 2016

Phase IV: Implementation

- Spec, Contractor Training, Architectural Design
 - Jun. 2016 – Sept. 2017
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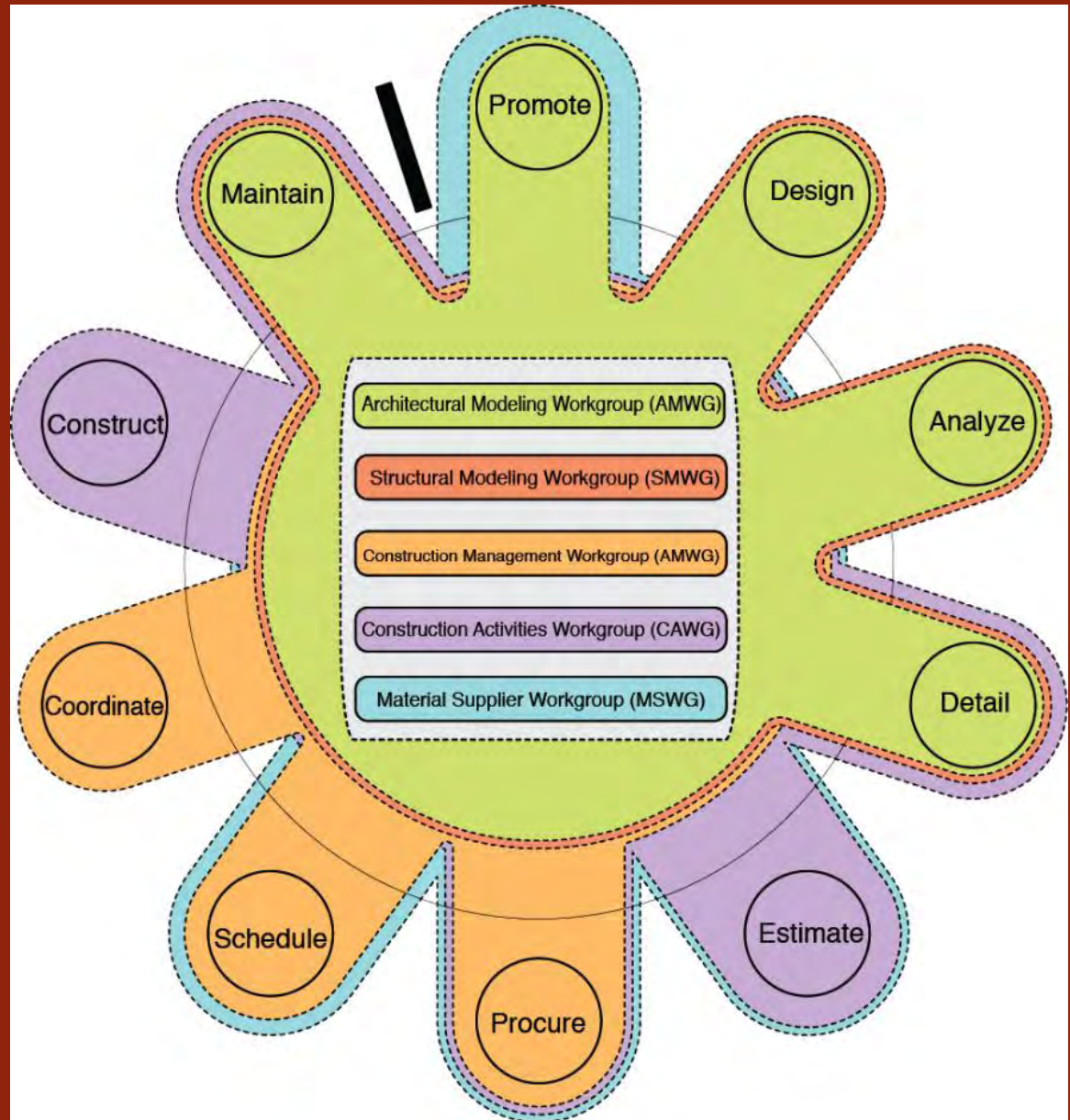
Working Groups

- *Architectural Modeling Working Group (AMWG)*
- *Structural Modeling Working Group (SMWG)*
- *Contractor/CM Working Group (CMWG)*
- *Construction Activities Working Group (CAWG)*
- *Material Supplier Working Group (MSWG)*



How do the workgroups relate:

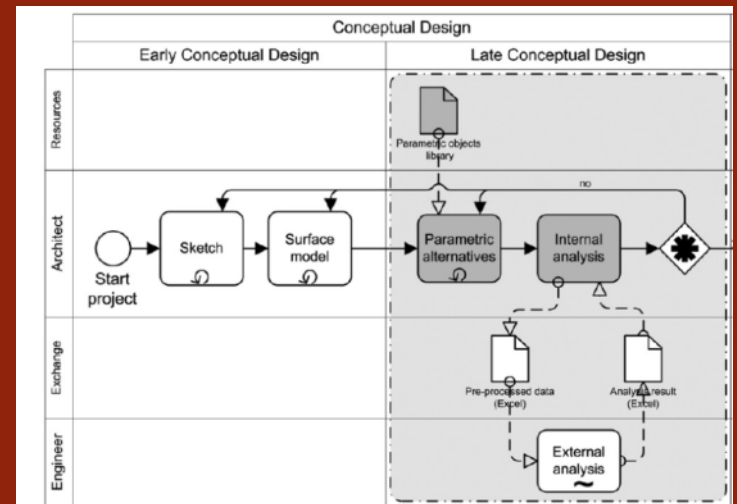
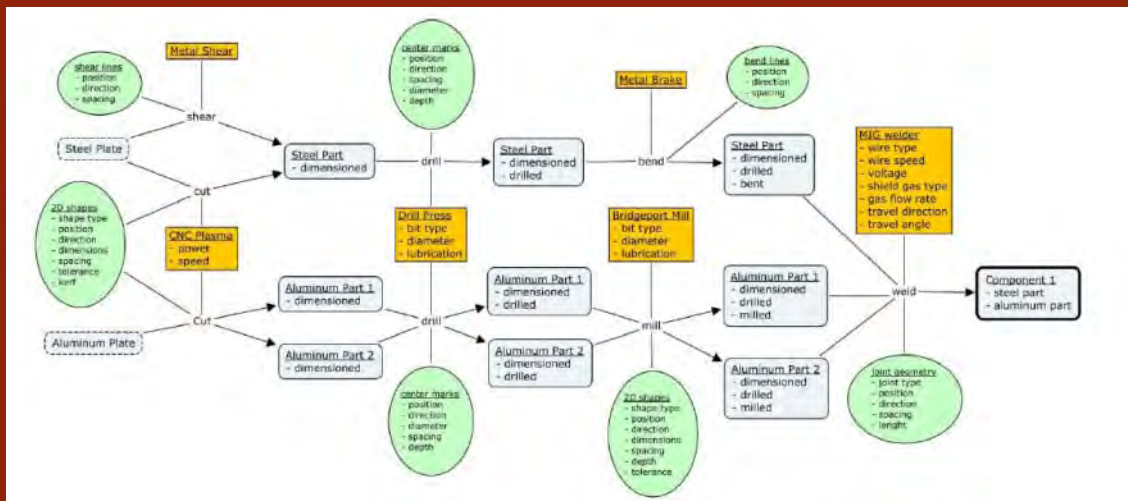
- To a specific building project?
- To BIM-M proposed activities?



Working Group Process

What will working groups produce?

- Vision for developers of BIM-M software
- Community with goodwill and momentum to develop BIM-M software
- Communication between industry stakeholders and BIM-M software developers
- Timeline and tasks for developing BIM-M software



Work Group - Goals

- Describe their processes, design, construction, etc.
 - Describe the actors in their processes, identify stakeholders
 - Describe how software tools are used in these processes – or not?
 - Discuss design-procurement-construction issues unique to masonry
 - Identify barriers to a more effective masonry industry
 - Discuss barriers to sharing information
 - Describe “handoffs” of information
 - Detail the information requirements for software tools to work
 - Create a vision for new software tools customized for masonry
 - Identify data embedded in, linked to, or generated by software
 - Identify barriers to achieving the vision
 - Describe tasks to overcome barriers
-
-

Masonry Unit Model Definition

- Survey masonry unit manufacturers
- Solicit input from working groups
- Develop interface for the input of masonry types
- Develop data structure prototype
- Provide data structure with selected masonry units incorporated in the database
- Provide data structure to stakeholders for input of their masonry units
- Demonstrate input of masonry unit into CAD software from the database



Masonry Unit Model Definition

	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG
1	BIM_M Materials																										
2																											
3		Dimension					Color - may be tied to color																				
4	Product Drawing	Width	Height	Length	Quantity per Square Foot	Number of Brick per Cube	Color	Density	Wt	Cold Absorption	Boil Absorption	C/B	IRA	Efflorescence	U-Value	R-Value	Solar Reflective Index	Grade [Weathering Resistance]	ASTM Specification	Type	Void Percent max	Void Percent Min	Traffic Abrasion Resistance	Compressive Strength	F'M	Cell Area	Face Cell Thickness
5																											
6	dwg, pdf	inches	inches	inches	value	value		pdf	lbs	%	%	%	gm/30 sq-in	yes/no			%	Class / Grade			%	%	Type	psi	psi	sq-in	inches
7																											
8	x	3.6250	#####	7.6250			Varies	120	per MFR	x	x	x	x	x	x	x	x	SW	C216	x	25	0	x	x	x	x	
9	x	3.6250	#####	7.6250			Varies	120	per MFR	x	x	x	x	x	x	x	x	SW	C216	x	25	0	x	x	x	x	
10	x	3.6250	#####	7.6250			Varies	120	per MFR	x	x	x	x	x	x	x	x	SW	C216	x	25	0	x	x	x	x	
11	x	3.6250	#####	7.6250			Varies	120	per MFR	x	x	x	x	x	x	x	x	SW	C216	x	25	0	x	x	x	x	
12	x	3.6250	#####	7.6250			Varies	120	per MFR	x	x	x	x	x	x	x	x	SW	C216	x	25	0	x	x	x	x	
13	x	3.6250	#####	#####			Varies	120	per MFR	x	x	x	x	x	x	x	x	SW	C216	x	25	0	x	x	x	x	

Masonry Unit Model Definition

- Dimensions, density, weight
- ASTM: Standard, Grade, Type, void area
- Physical properties: Compressive strength, CWA, BWA, C/B
- Elective tests: IRA, efflorescence
- Thermal properties: U-value, R-value
- Fire resistance properties: Fire resistance rating
- Sound properties: STC rating, OITC rating
- Cleaning: Recommended product
- Manufacturer and Distributor: Contact information



Building Information Modeling for Masonry (BIM-M)

Will allow complete management of project
from beginning to end of building life:

- Schematic Design thru Construction Documents
- Conflict Resolution
- Schedule Development
- Take-Offs and Cost Estimating
- Facility Management



BIM-M Questions?

