Making the Business Case for Concrete

Quadruple the Quantity of Concrete on Building Projects Using the Concrete Design Center

Patrick Matsche
Building Promotions, NRMCA

Empirical – Quantifiable Data

4-7 stories | 200,000 ft^2

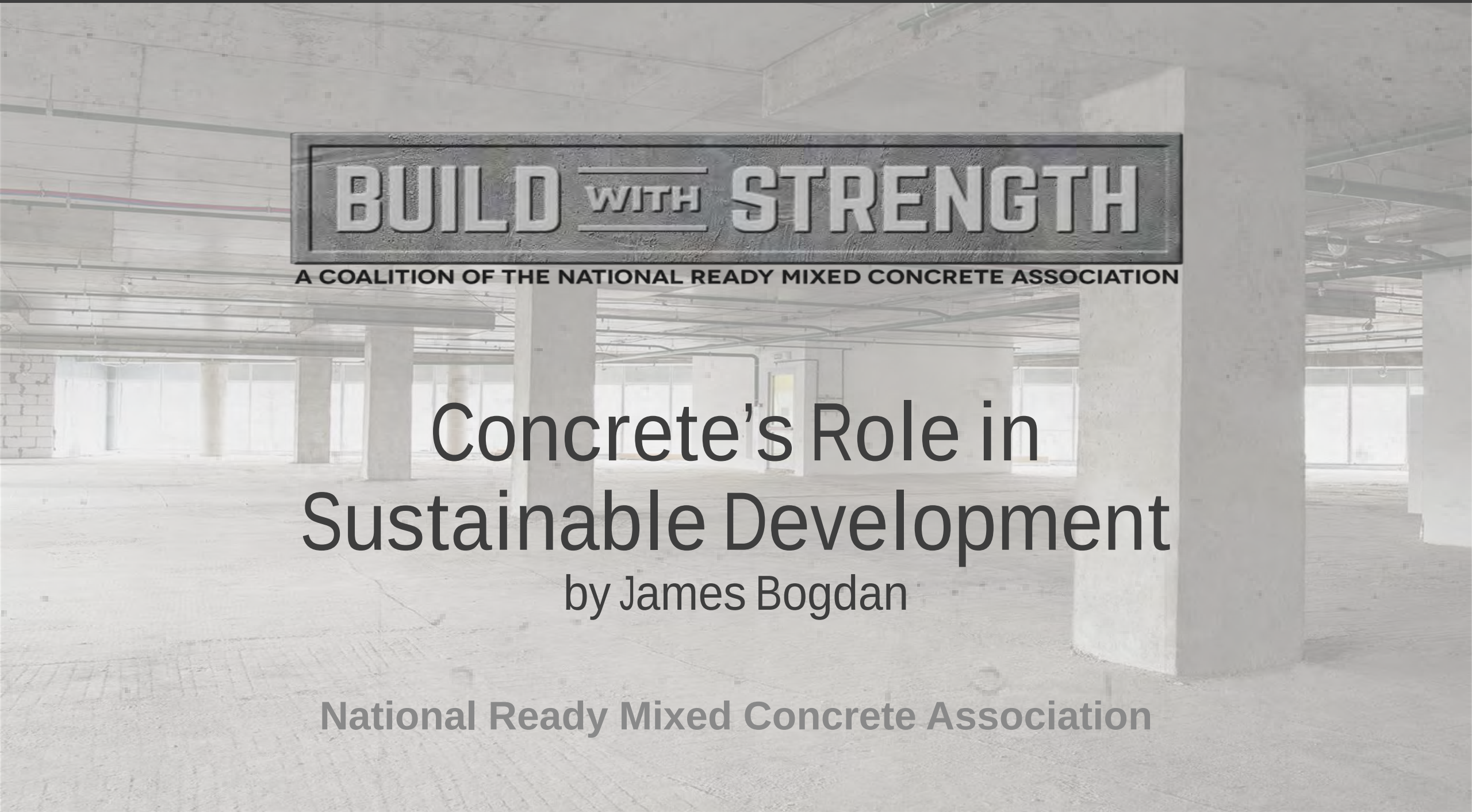
8,000 yd^3

2,000 yd^3

- We lose 6,000 yd^3 per project
- We lost 7.3 million yd^3 in 2016*
- $1 Billion in revenue

* Dodge Data & Analytics, 4-7 story buildings, excluding parking garages


reTHINK
WOOD
Renewable by nature.
Pavilion
$33M
GREENBUILD
ALL (GREENBUILD) CARPET LEADS TO NEW CARPET
WoodWorks
AMERICAN WOOD COUNCIL

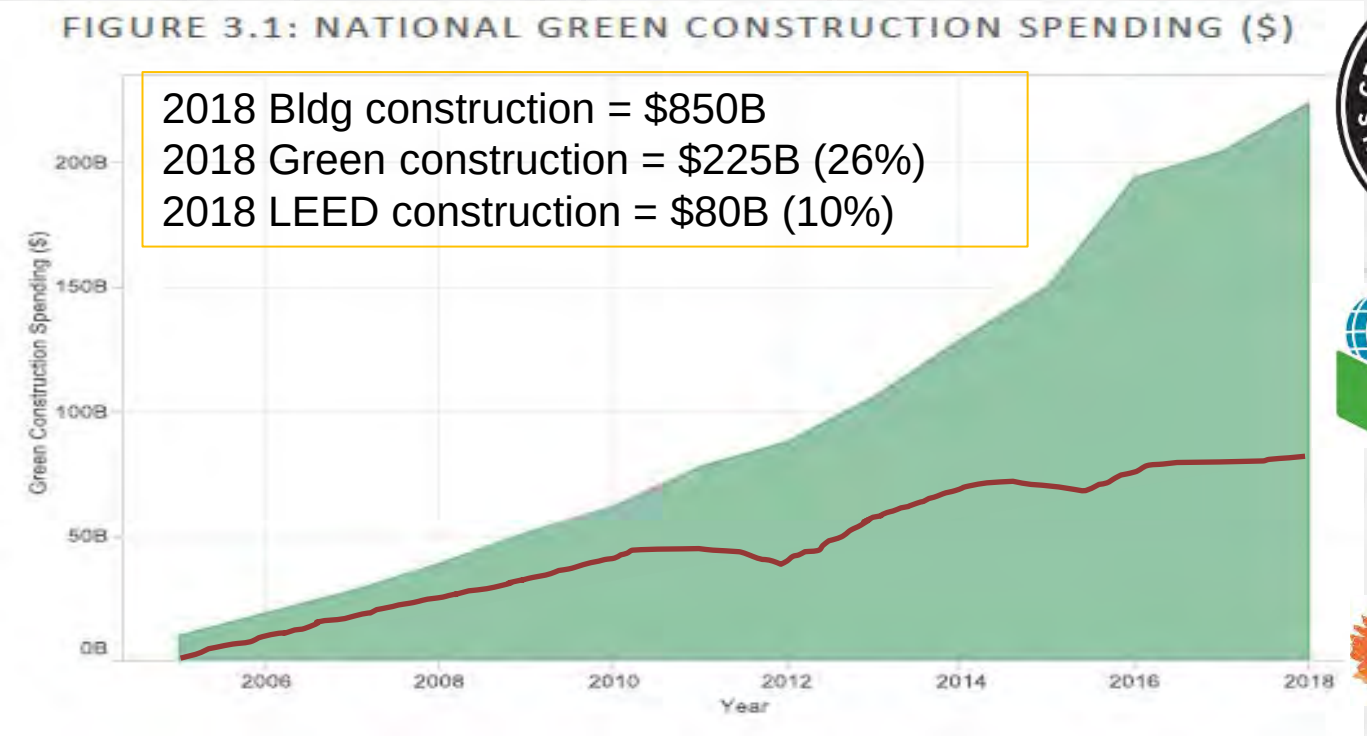


Concrete's Role in Sustainable Development

by James Bogdan

National Ready Mixed Concrete Association

Market Opportunity: Green Building



Source: USGBC Green Building Economic Impact Study. Booz Allen Hamilton. Sept 2015.

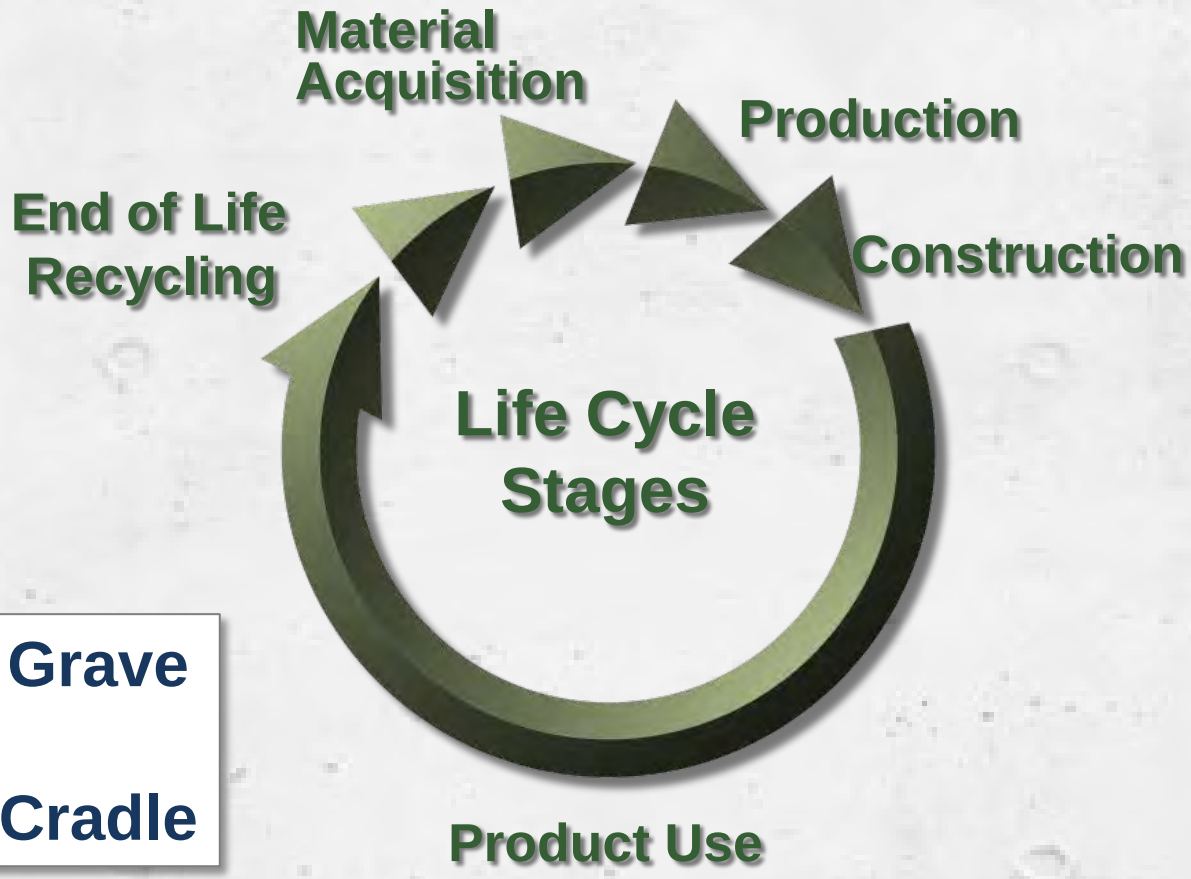
BUILD WITH STRENGTH

Attributes of Ready Mixed Concrete

- Local material
  - Abundant raw materials and production is local
- Minimal processing
  - Efficient operations
- Uses wastes (by-products) from other industries
  - Fly ash, slag
- Thermal mass
  - Reduces energy consumption during building operations
- Resilient / long service life
  - Low maintenance
- Recyclable

BUILD WITH STRENGTH

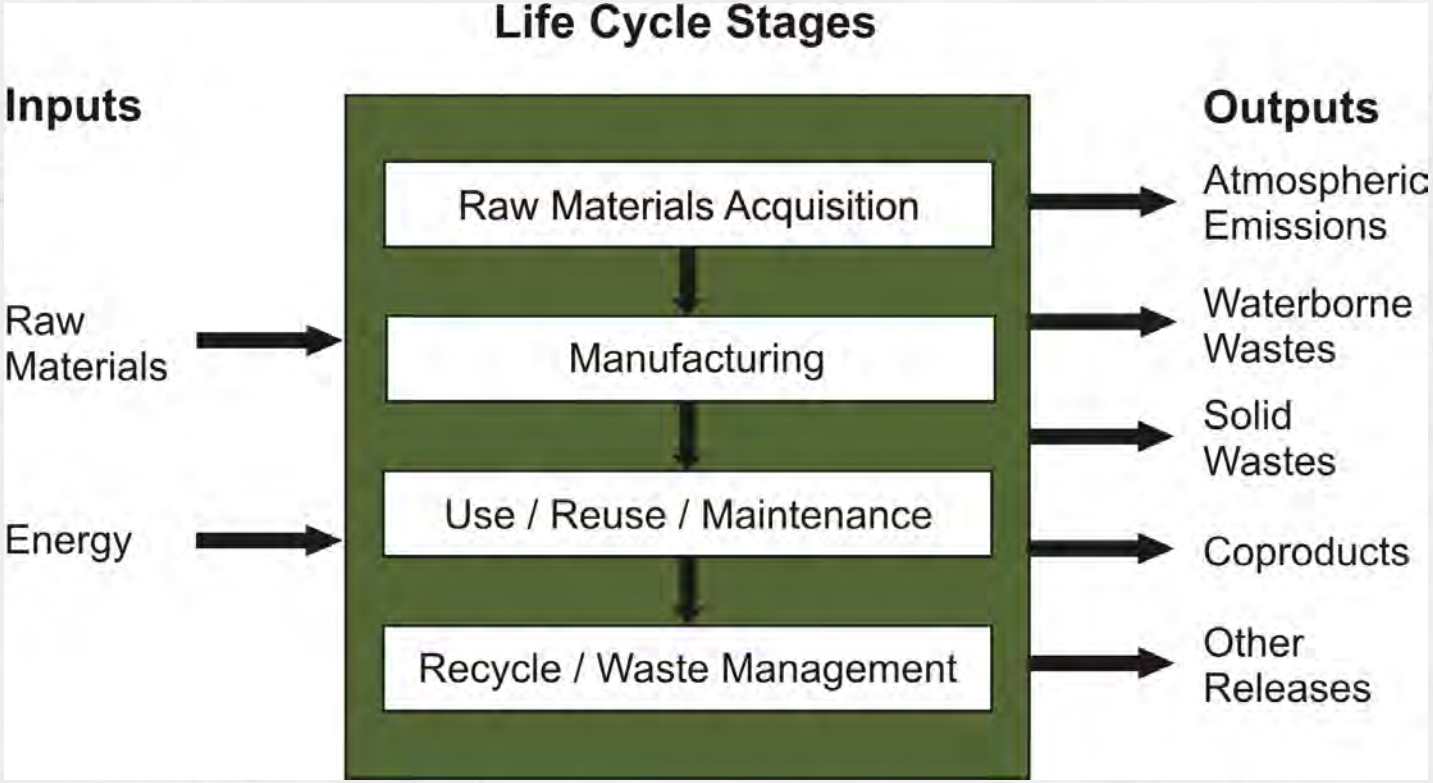
Life Cycle Perspective



Cradle to Grave
TO
Cradle to Cradle

BUILD WITH STRENGTH

Life Cycle Perspective



Source: EPA (2003)

BUILD WITH STRENGTH

Extraction: Logging

- Wood products
- Disruption per unit of building material is high
- Renewal takes generations
- Stream damage common

Source: Natural Resources Canada

BUILD WITH STRENGTH

Impact Index

Resource Impact Index		
Concrete	Aggregate Quarrying Limestone Quarrying	1.00 1.50
Steel	Iron Ore Mining	2.25
Wood	Boreal Timber Harvesting Coastal Timber Harvesting	2.50 3.25

Source: Natural Resources Canada

BUILD WITH STRENGTH

Summary: Concrete Life-Cycle Benefits

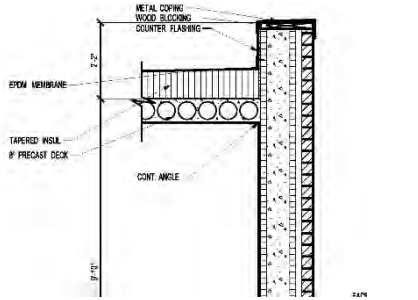
Concrete Feature	Sustainable Design Benefit
Most materials harvested and manufactured locally	Minimizes transportation energy
Most ingredients require little processing	Minimizes energy of production
Incorporates recycled industrial byproducts	Reduces the energy required for manufacturing & landfilling of industrial wastes
Absorbs CO_2 throughout its lifetime through carbonation	Reduces carbon footprint
Building systems combine insulation and thermal mass	Homes and buildings more energy efficient
Long service life	Minimizes reconstruction, repair and maintenance
Recyclable	Existing infrastructure exist to place spent product as a raw material into another product

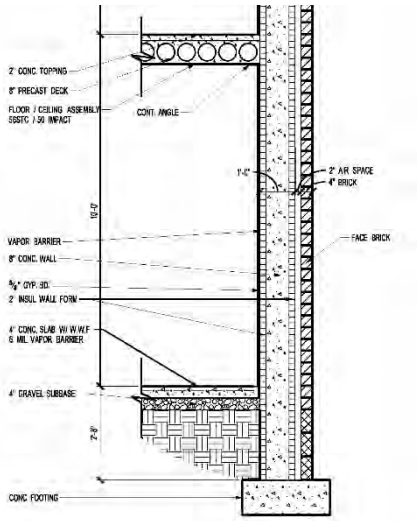
BUILD WITH STRENGTH

Concrete Design Center

Architectural Design |Structural Design |Cost Analysis

Energy Analysis | LEED Optimization





Infrared images courtesy of Logix

Why Should NRMCA Promote ICFs?

Cost Estimate of 100,000 Square Foot Apartment Building – National Average

A comprehensive cost estimate was conducted for a typical four story, 100,000 square foot apartment building using National Average costing data from RS Means. The building consists of 92 apartments, 60 one bedroom apartment and 32 two bedroom apartments (see figure 1). The cost estimate was conducted for both combustible construction and non-combustible construction. Cost estimates were derived from RS Means, the most widely known and respected cost estimating data available.

The combustible construction consists of wood frame construction for all the walls, floors and roof of the building (see figure 2). The non-combustible construction consists of Insulating Concrete Walls (ICF) construction for the exterior, corridor, demising and fire walls and precast hollow core plank for the floors and roof framing (see figure 3). The following are the results of the cost estimate:

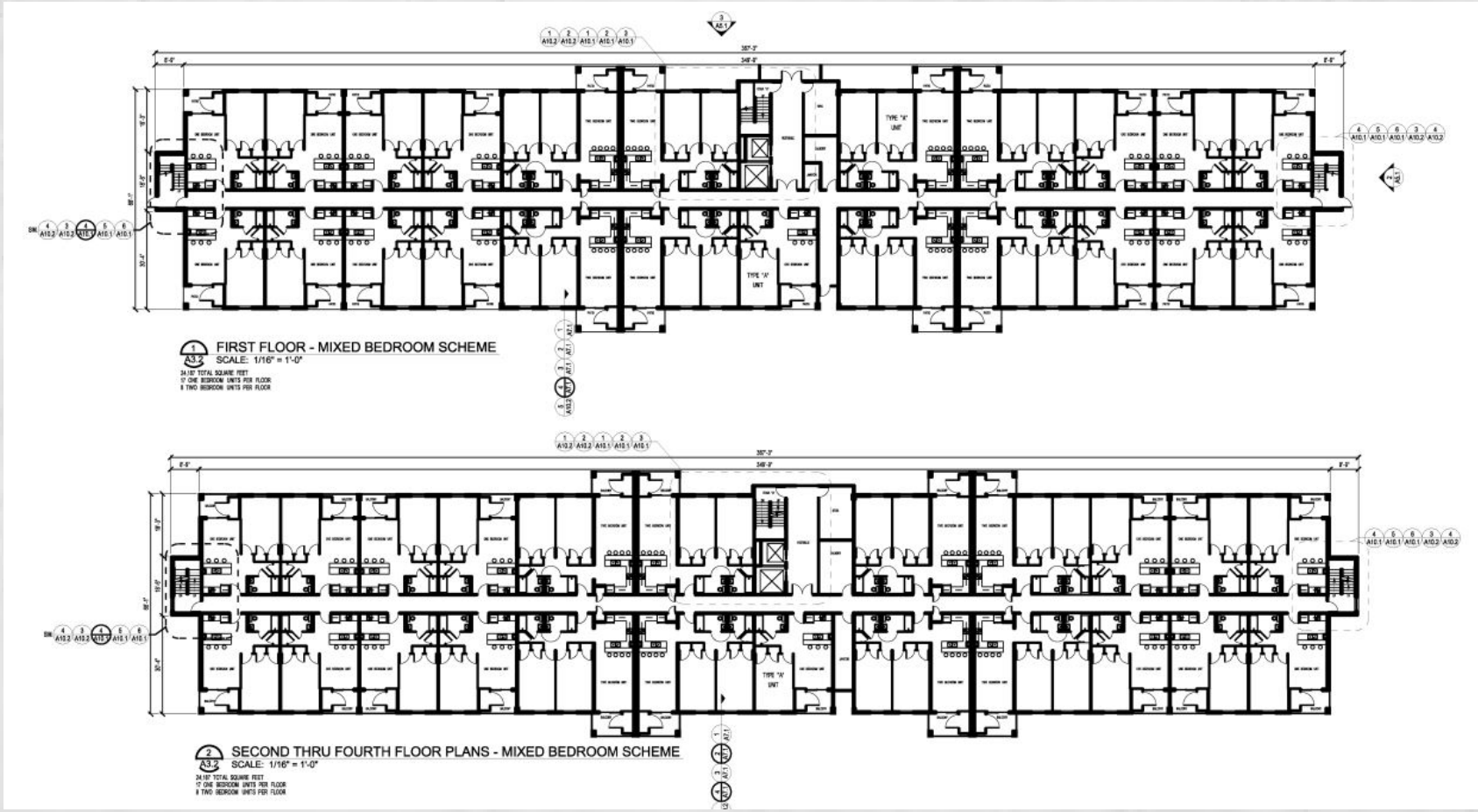
Combustible: **$14,817,449** Non-combustible: **$14,818,983**

FRONT ELEVATION - TWO BEDROOM SCHEME
SCALE: 1/16" = 1'-0"

ICFs – Very Competitive on First Cost

4 story Multi-family reference building, $10-$15 million cost of construction

Towson, MD	0%
Pittsburgh	2%
Austin, TX	1%
Kansas City	-1%
Albany	3%
Athens, GA	3%
Phoenix, AZ	-1%
Melville, NY	1%
Sacramento, CA	1%

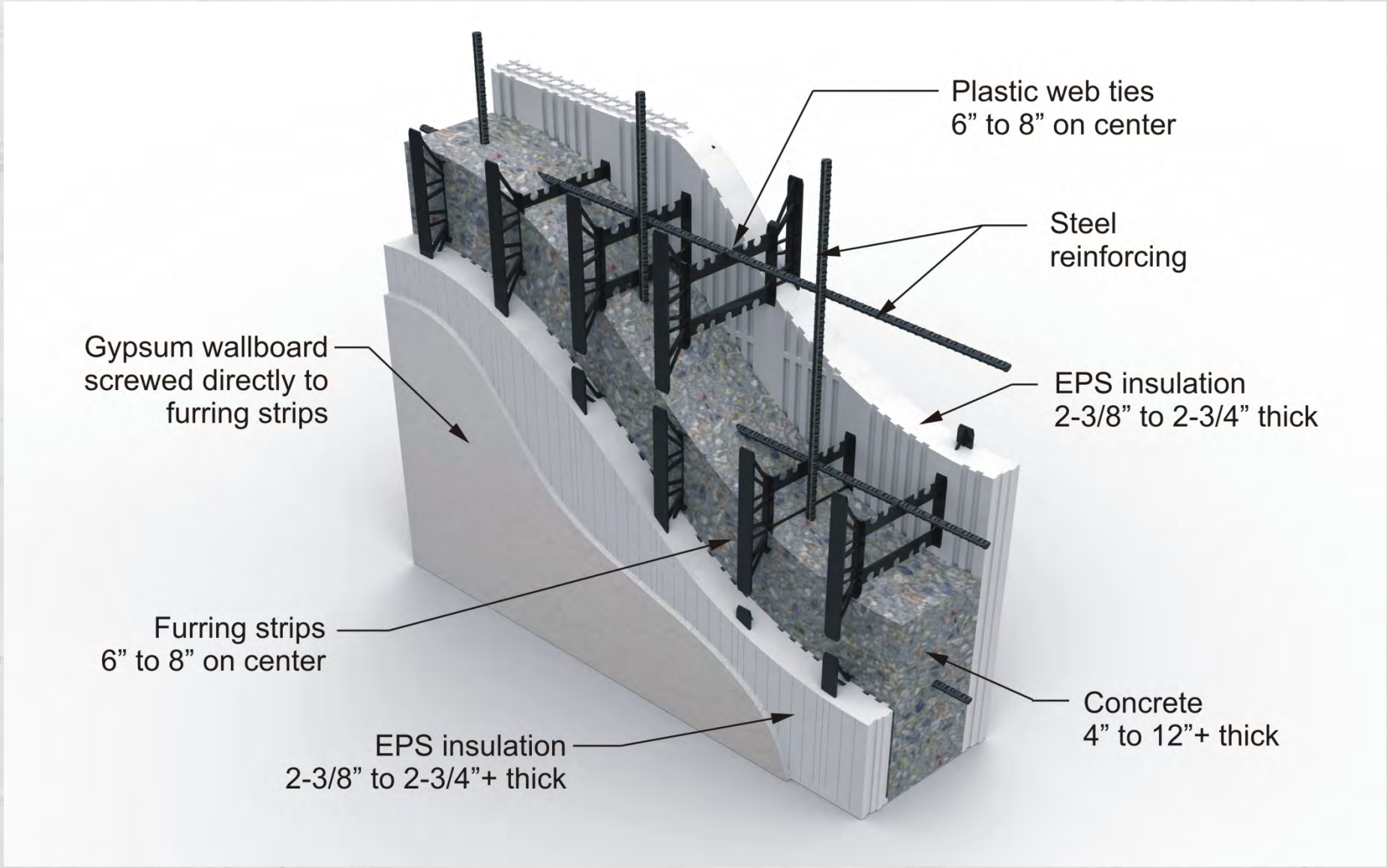


ICFs Increase Revenues for Owner

	Individual Metered		Master Metered	
	Wood	Concrete	Wood	Concrete
Revenues				
Gross Pot				0000
Losses t				4600
Collecti				7000
Losses t				5000
Other Re				0000
Total Rev				**3400**
Operating				
Salaries a				3000
Insurance				3600
Taxes				3000
Utilities	35000	28000	104000	83200
Management Fees	39000	0000	59000	59000
Administration	28000	2	38000	38000
Marketing	19000	19000	18000	18000
Contract Services	38000	38000	52000	52000
Repair and Maintenance	5200	52000	00	81000
Total Operating Expenses	**5450**	**526800**	**714**	**680800**
Net Operating Income	**884000**	**925600**	**1016000**	**1072600**

Individual metered wood to master metered concrete: <u>INCREASE</u> in Net Operating Income of $188,600 every year

ICFs: Strong – Efficient – Easy to Use

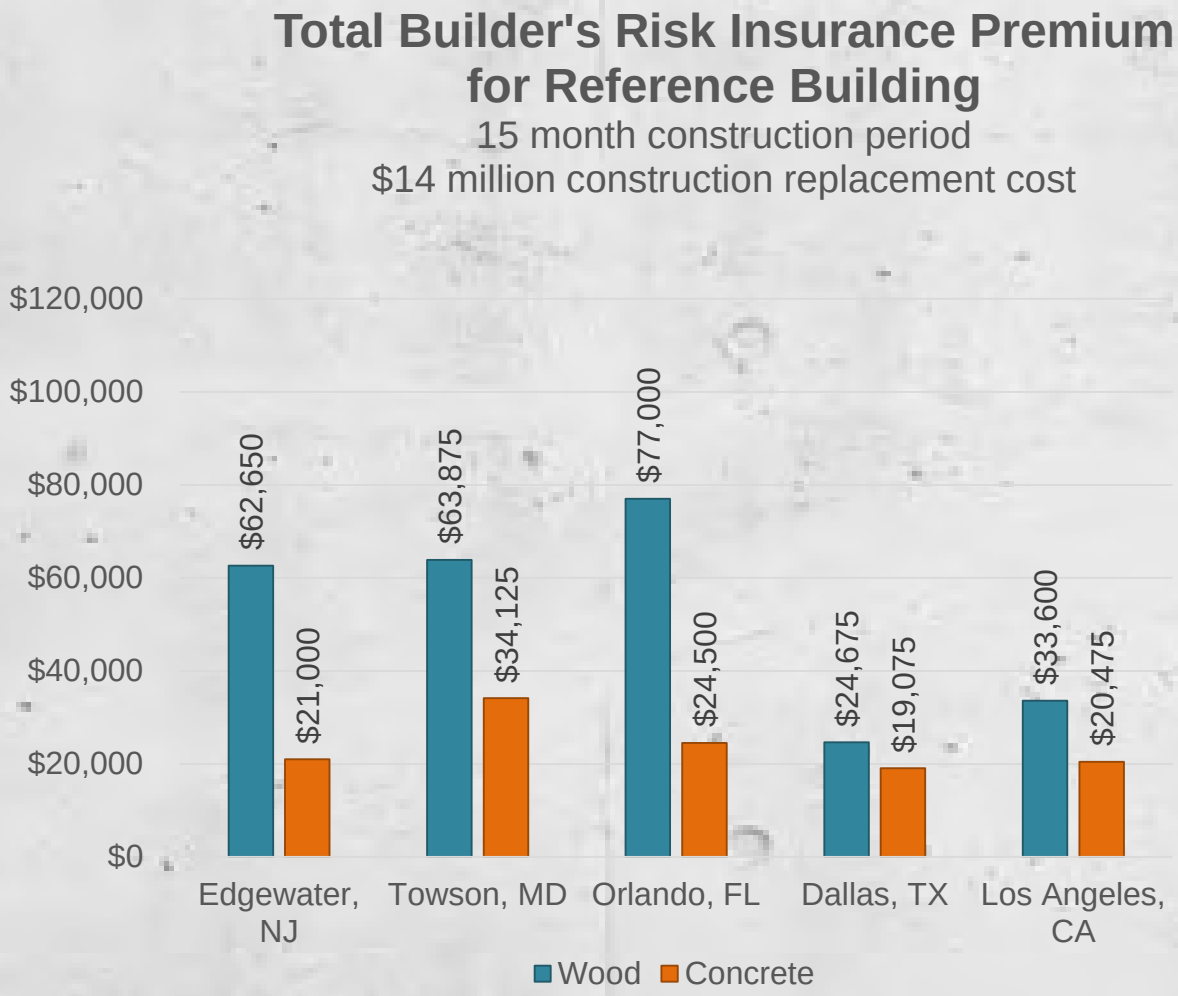


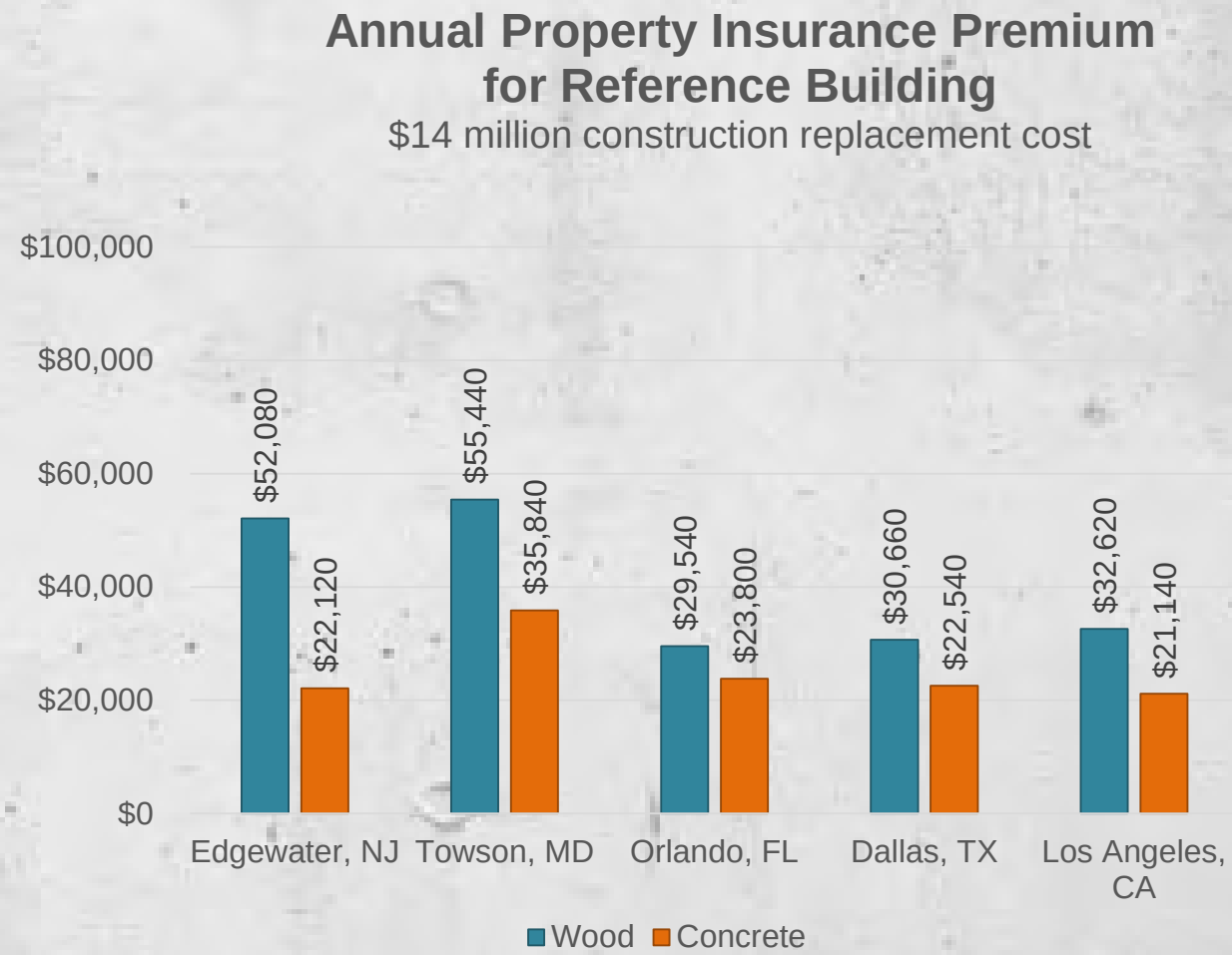
ICFs are Ideal for Low to Mid-Rise Building

ICFs Make Buildings Safer…

- Walls (Fire Ratings)
  - 2 hrs for 4” wall
  - 3 hrs for 6” wall
  - 4 hrs for 8” wall
- Floors (Fire Ratings)
  - 2 to 3 hrs
  - Depends on system

Reduce Insurance Costs






Feb 2017
Maplewood, NJ


Jan 2017
Lynnwood, WA


Jan 2017
Laurens, NY


Jan 2017
Kane, PA


Dec 2016
Cambridge, MA


Oct 2016
Oakland, CA

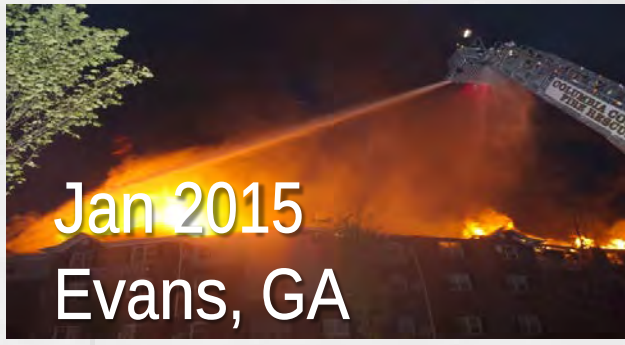

Oct 2016
Gilbert, AZ


Aug 2016
Northampton, MA


Feb 2016
Norfolk, VA


Apr 2015
Baltimore, MD


Jan 2015
Edgewater, NJ


Jan 2015
Evans, GA


Apr 2014
Rockville, MD

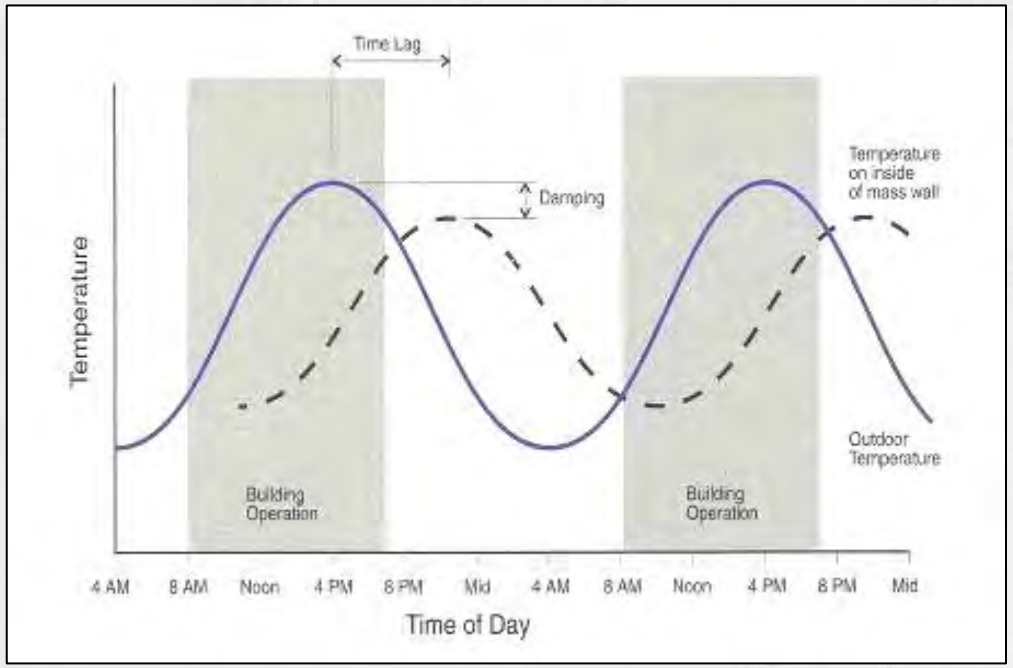

Mar 2014
Houston, TX


Mar 2014
Odenton, MD


Mar 2017
Raleigh, NC

Green Building Programs

Concrete Thermal Mass



- Thermal Mass
- Increase thermal lag
  - Off peak demand
  - Lower energy costs
- Lower peak energy
  - Smaller, more efficient HVAC equipment
- Reduce temperature swings
  - Less heating and cooling energy required

Concrete Thermal Mass

Tilt-up Concrete Walls

Insulating Concrete Forms

Removable Form Systems

BUILD WITH STRENGTH

Value – Energy Efficiency

PHIUS
Multifamily Resource Center

“The best performing building in a multifamily new construction four stories or greater that SWA has ever worked on in that category.” – Steven Winter Associates, Inc. (SWA)

Introduction

Beach Green Dunes will be designed to meet stringent energy standards set by Passive House Institute US (PHIUS), the New York State Energy Research and Development Authority (NYSERDA), and more. The development will also include resilient features to weather the heavy storm conditions in Far Rockaway, Queens, New York.

Concrete and Sound

Intent: To provide workspaces and classrooms that promote occupants' well-being, productivity, and communications through effective acoustic design.

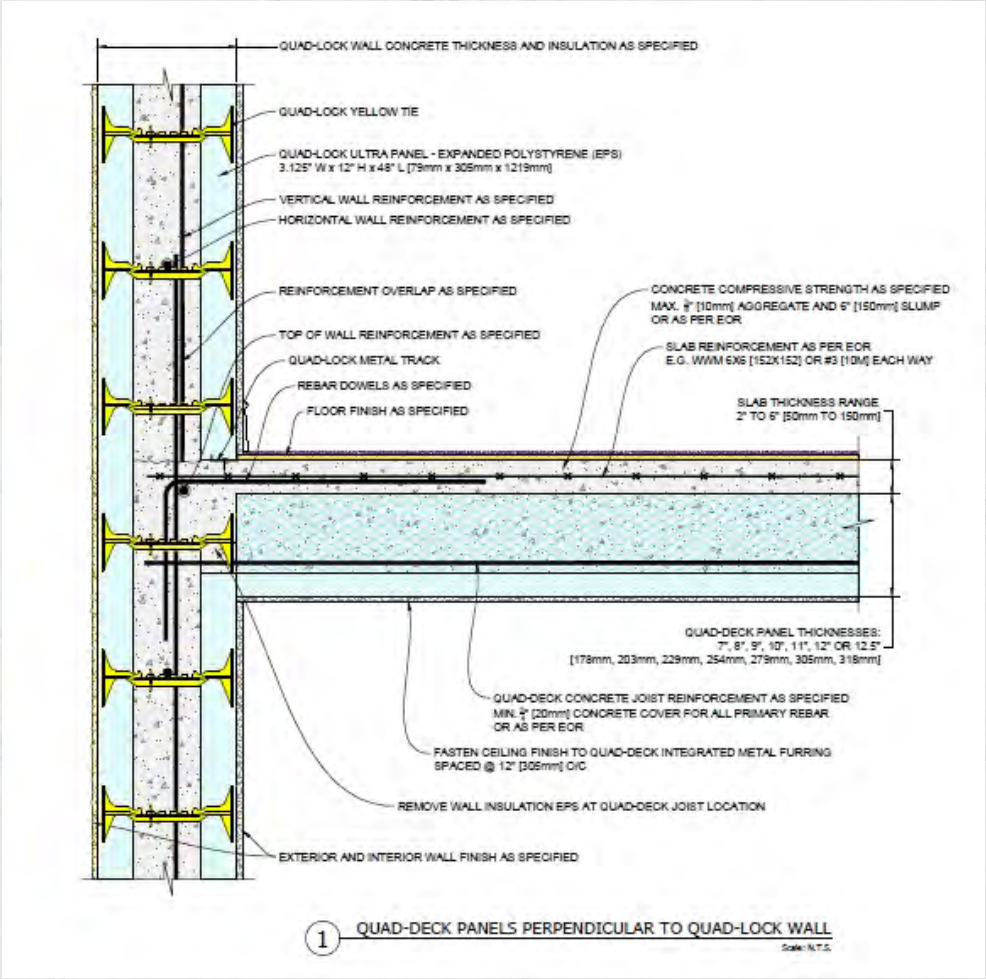
Table 1. Maximum composite sound transmission class ratings for adjacent spaces

Adjacency combinations		STC_C
Residence (within a multifamily residence), hotel or motel room	Residence, hotel or motel room	55
Residence, hotel or motel room	Common hallway, stairway	50
Residence, hotel or motel room	Retail	60
Retail	Retail	50
Standard office	Standard office	45
Executive office	Executive office	50
Conference room	Conference room	50
Office, conference room	Hallway, stairway	50
Mechanical equipment room	Occupied area	60

BUILD WITH STRENGTH

Quiet = Happy Tenants Save You Money

- Walls
  - STC: 55-70
- Floor
  - STC: 50+
  - IIC: 50+

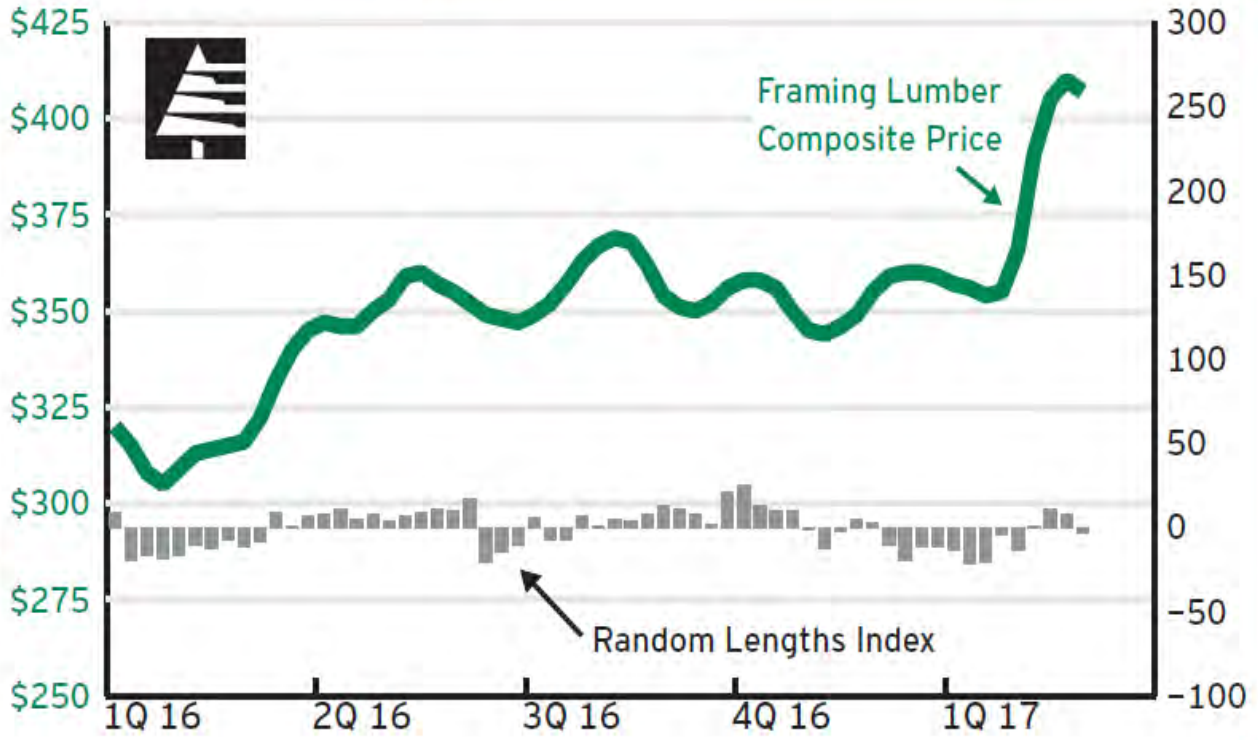


Wood Prices Keep Going Up…

Lumber Market Indicators

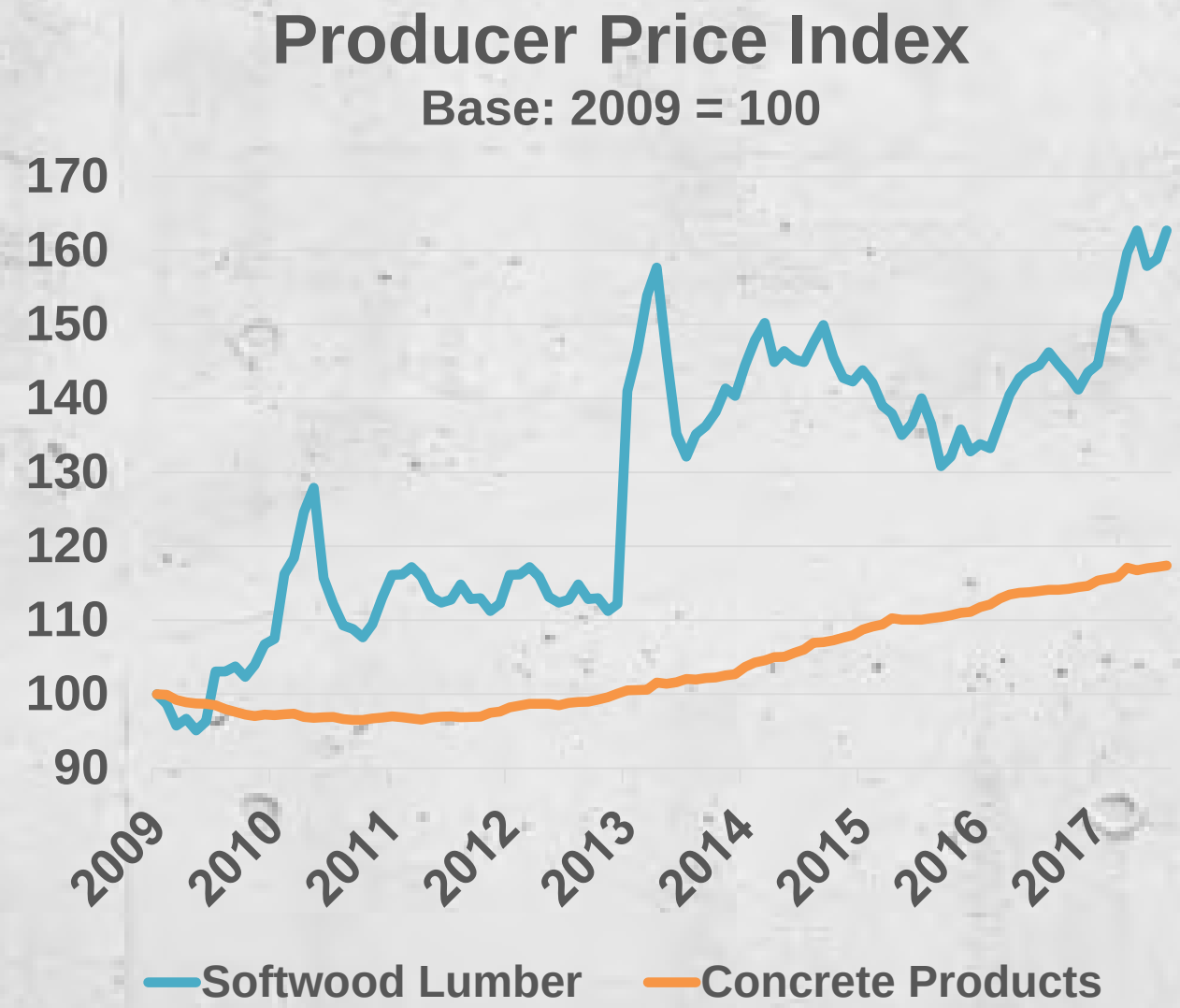
	This Week	Last Week	Year Ago
Framing Lumber Composite Price	**$407**	**$410**	**$316**
2x4 #2&Btr KD Western S-P-F	369	385	276
2x4 Std&Btr Grn Douglas Fir (Portland)	370	370	322
2x4 #2 KD SYP (Westside)	490	488	367
2x4-8' PET KD Western S-P-F	332	348	215
1x12 #3 KD Ponderosa Pine	510	500	345
Random Lengths Index*	-2.9	+8.3	-11.0

*The index is a numerical representation of market activity, based on a ratio of western sawmill order files to inventories. In computing the index, the data are compared with similar data averaged over the past five years.



- **Framing lumber composite price is up this week $41 from week ending February 3rd and up $91 year to date.**

Wood Prices Keep Going Up…



…and the labor market gets tighter

DJIA ▼ 21812.09 -0.40% Nasdaq ▼ 6278.41 -0.30% U.S. 10 Yr ▲ 13/32 Yield 2.167% Crude Oil ▲ 48.38 1.15% Euro ▲ 1.1818 0.48%

THE WALL STREET JOURNAL.

Subscribe Now | Sign In
$1 for 2 Months

BUSINESS
For Some Craft Brewers, Sales Are Tapping Out

U.S. NEWS
How Much Will Motorists Pay for Tappan Zee Bridge's ...

MARKETS
The Price Isn't Right for Home Builders

MARKETS | HEARD ON THE STREET

Wood and Workers Squeeze Housing Market

Tightening labor market in construction, high lumber prices hit profit margins

By *Justin Lahart*

May 9, 2017 1:11 p.m. ET

...Even When the Unthinkable Happens

2013

March 12, 2014

- Natural Gas Explosion Next Door
- 2 Buildings Collapse
- 8 People Killed
- 70 People Injured
- 100 Families Displaced

2015

…there's still more trouble with wood

"I strongly recommend that we slow down and figure out how to build structures that will last, and spend less time on how to build them more cheaply and more quickly. Until then, I (along with other experts and construction litigation attorneys) will enjoy the abundance of work provided by investigating damages associated with typical wood construction practices."

"In summary, mid-rise wood framed buildings may be allowed by the code; however, if we don't start changing our construction practices to deal with the challenges, we are asking for trouble."

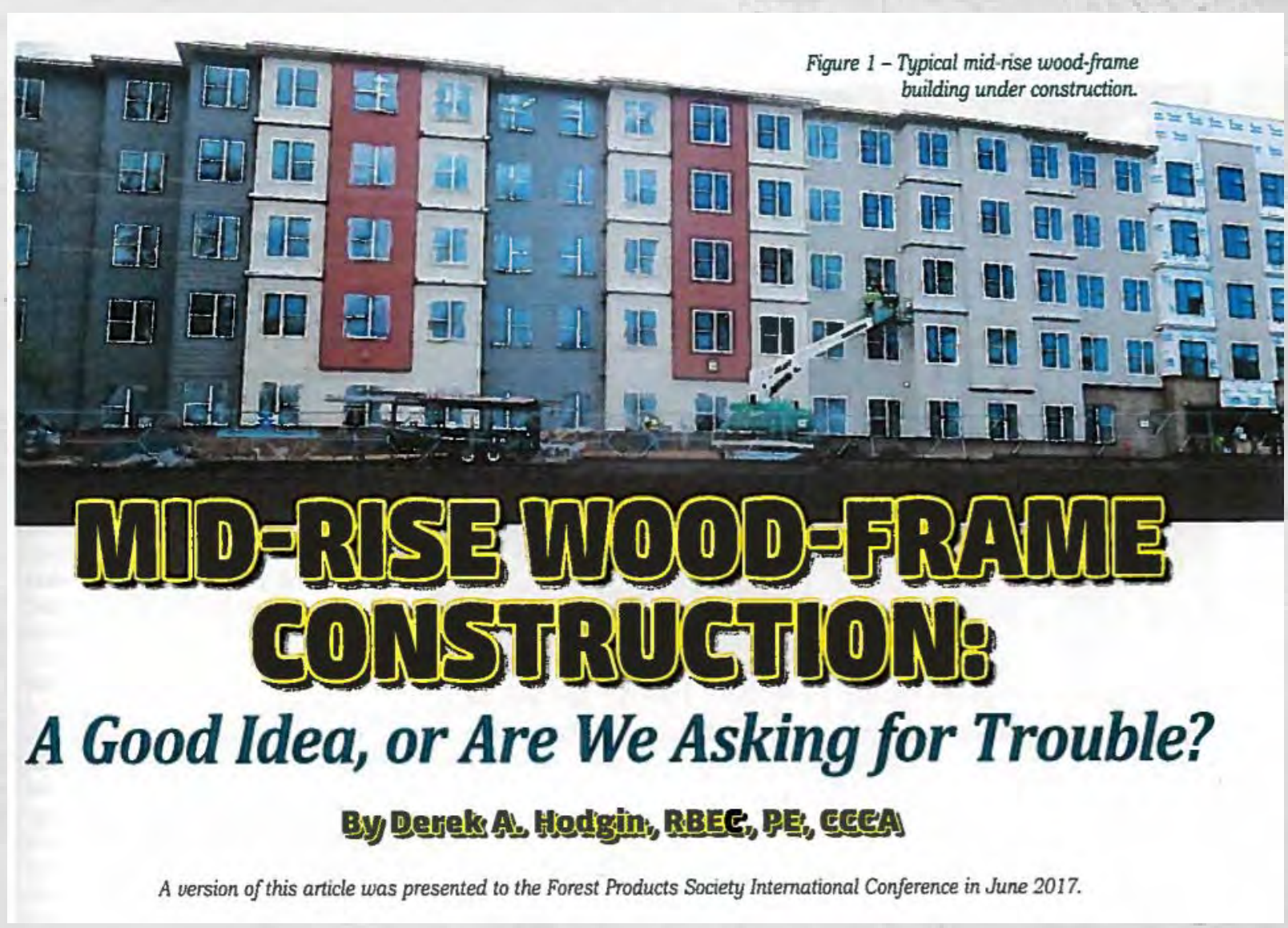


Figure 1 – Typical mid-rise wood-frame building under construction.

MID-RISE WOOD-FRAME CONSTRUCTION:

A Good Idea, or Are We Asking for Trouble?

By Derek A. Hodgin, RBEC, PE, CCCA

A version of this article was presented to the Forest Products Society International Conference in June 2017.

ICFs have a track record of Success

ICFs have a track record of Success

Lane Miles Standish
Portland, OR

- $8 Million
- 25,000 SF Apartments
- 5,000 SF Retail/Offices

ICFs have a track record of Success

Ricchi Condominium
San Antonio, TX

ICFs have a track record of Success

Bellarmine University Dormitories Louisville, KY

104,000 SF project

Awarded this project based on speed of construction

Started: Jan 2007

Completed: July 2007

ICFs have a track record of Success

Drury Inn
All
Locations

Hotel Owner and Operator

Less Expensive to Operate and More Durable

15 ICF Hotels currently under construction

Operates 55 ICF Hotels

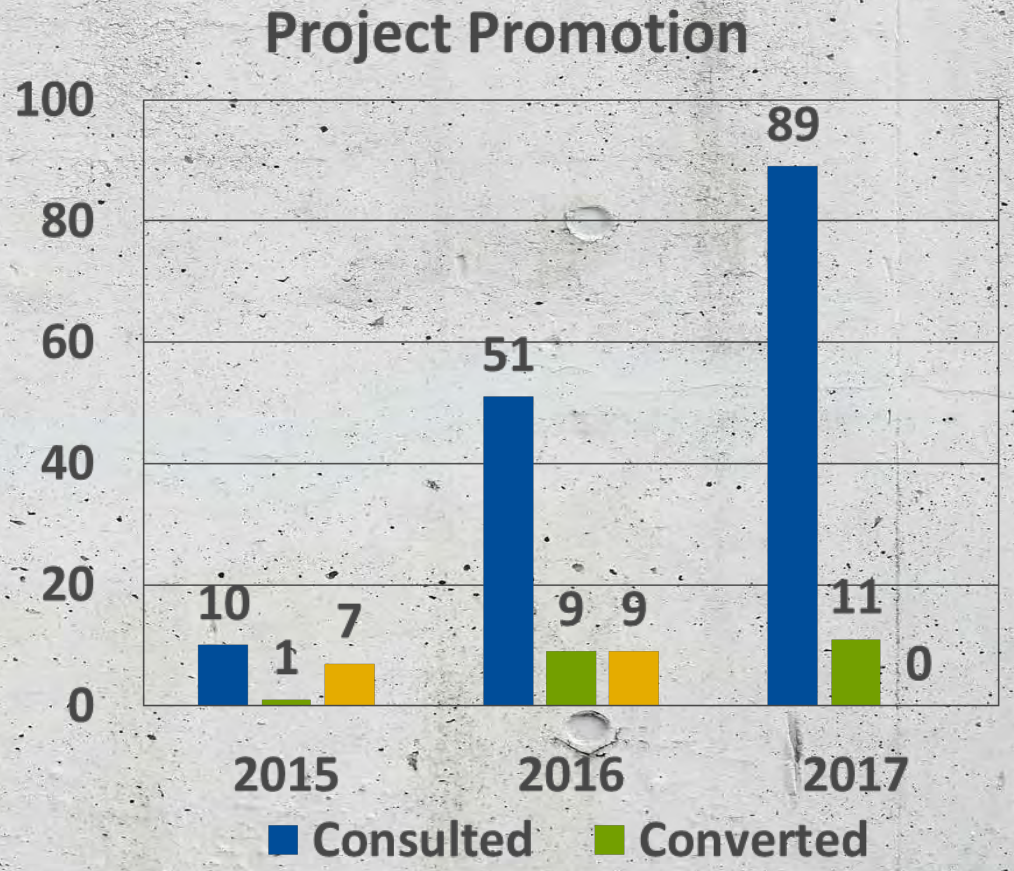
We can save you money and time

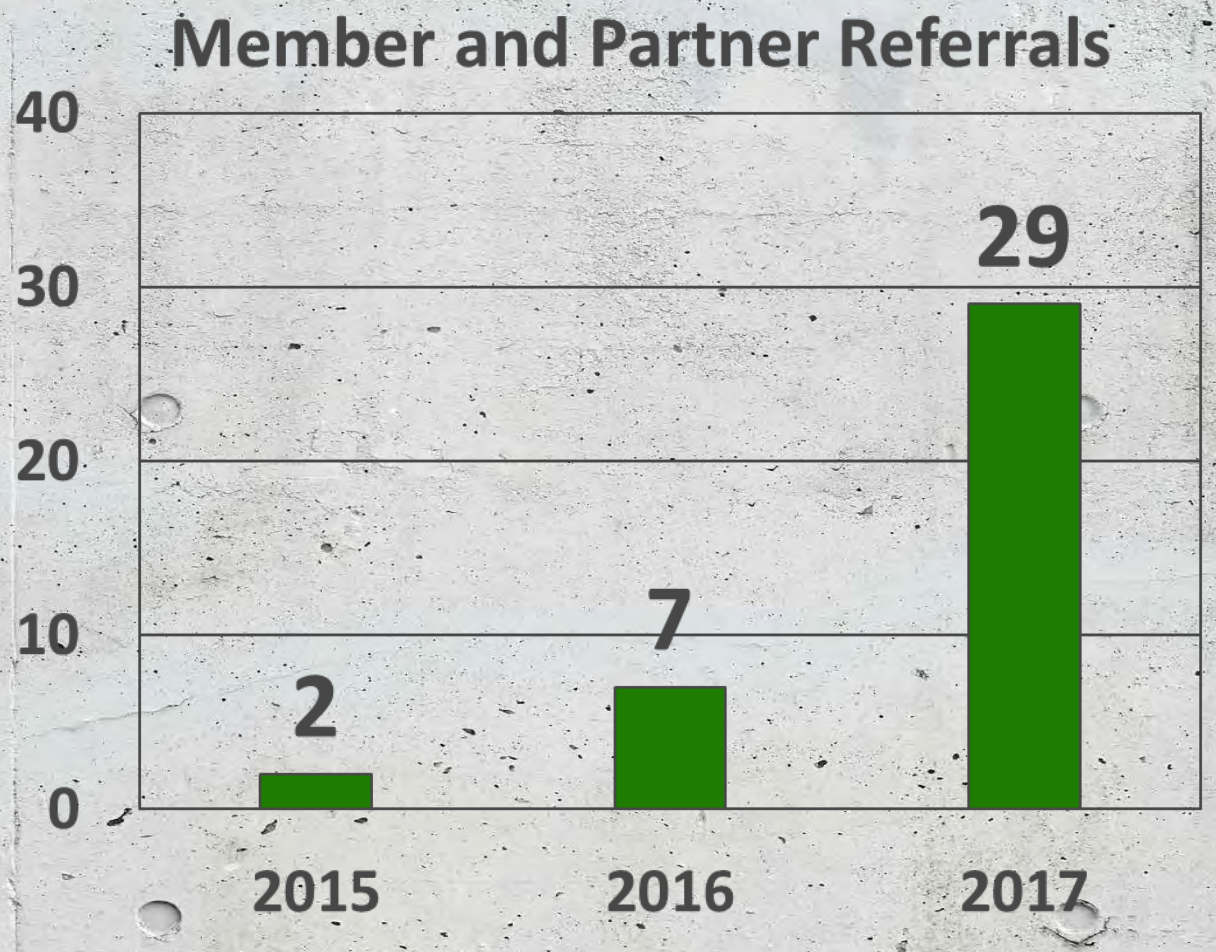
Direct Project Promotion – Convert projects to concrete through the Concrete Design Center

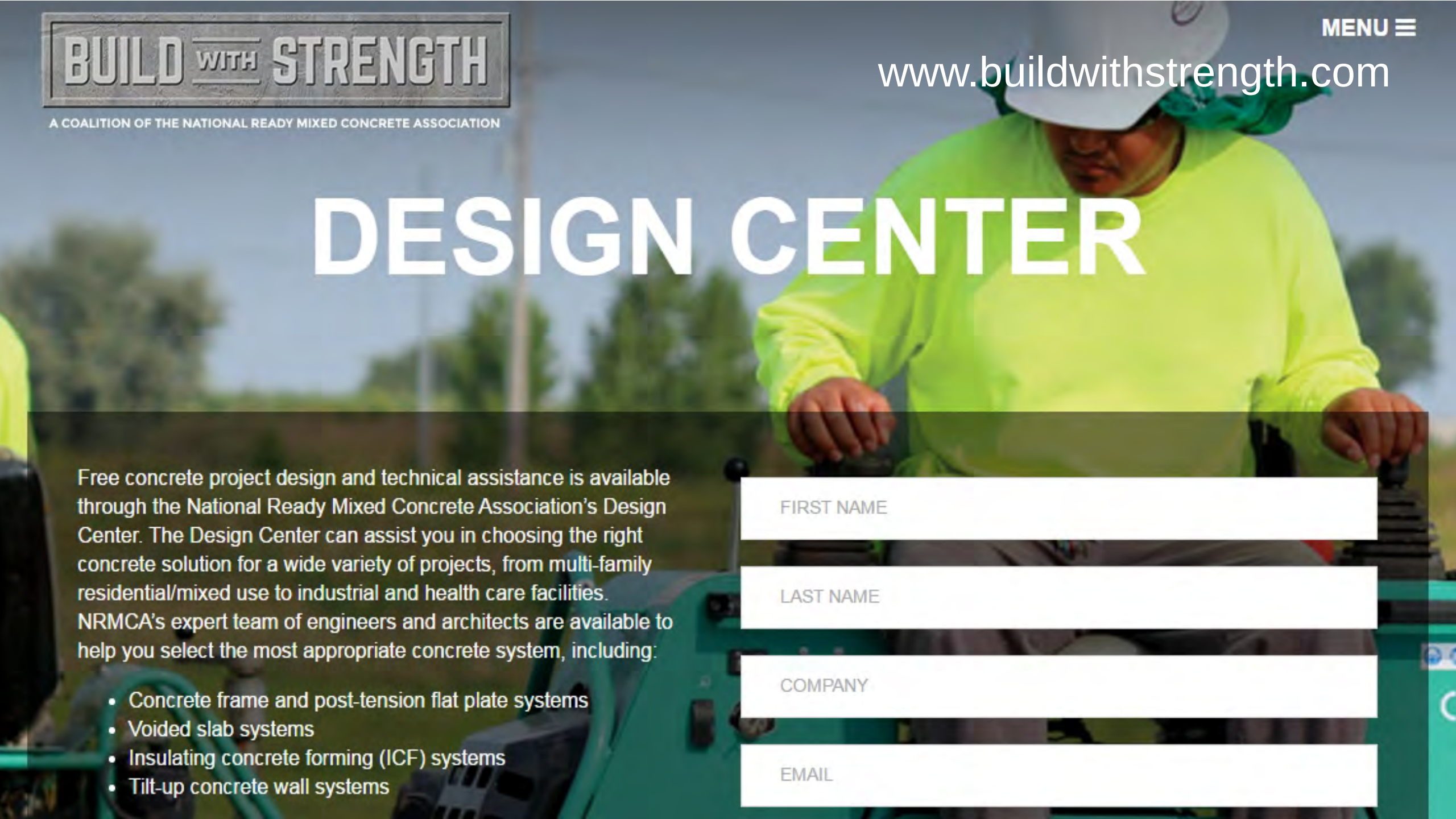
2030 Target

750

Converted




Member and Partner Referrals
40
30
20
10
0
2
7
29
2015
2016
2017


BUILD WITH STRENGTH
A COALITION OF THE NATIONAL READY MIXED CONCRETE ASSOCIATION
MENU
www.buildwithstrength.com
DESIGN CENTER
Free concrete project design and technical assistance is available through the National Ready Mixed Concrete Association's Design Center. The Design Center can assist you in choosing the right concrete solution for a wide variety of projects, from multi-family residential/mixed use to industrial and health care facilities. NRMCA's expert team of engineers and architects are available to help you select the most appropriate concrete system, including:
• Concrete frame and post-tension flat plate systems
• Voided slab systems
• Insulating concrete forming (ICF) systems
• Tilt-up concrete wall systems
FIRST NAME
LAST NAME
COMPANY
EMAIL

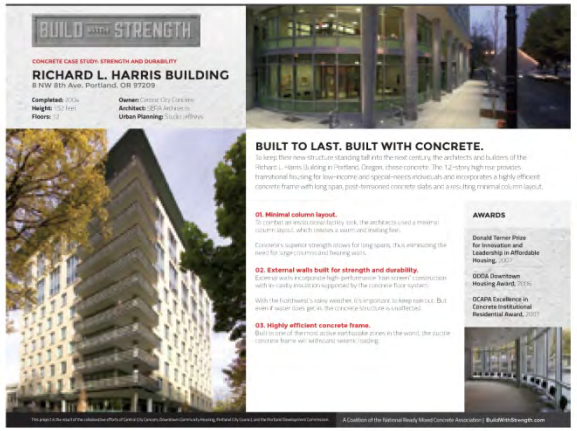
COLLATERAL

CASE STUDIES

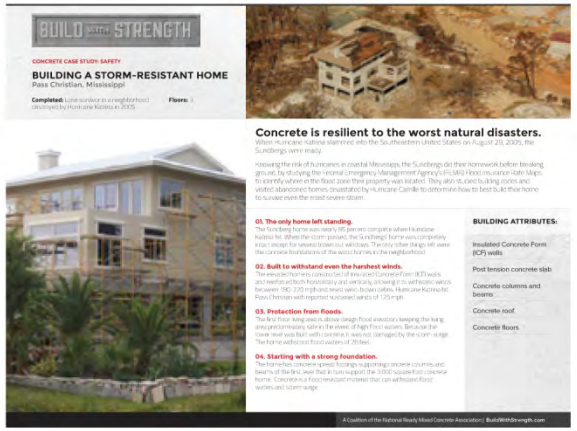
Real projects. Real proof.

Our case studies highlight concrete projects from across the U.S.--so you can get a first-hand look at the advantages of building with concrete.

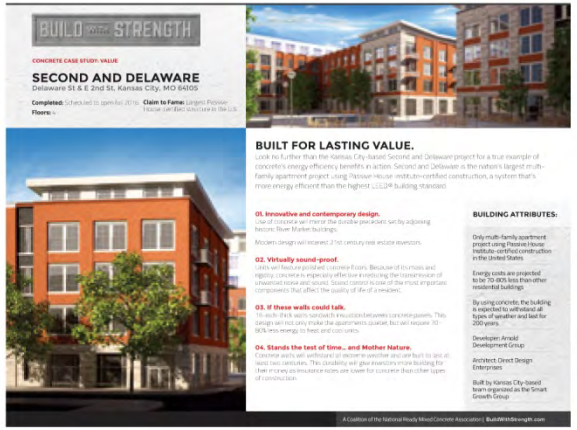
STRENGTH



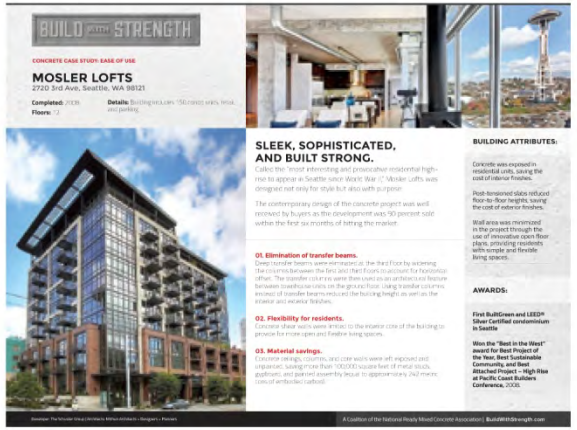
SAFETY



LONG TERM VALUE



EASE OF USE



MRc2: Company EPD

NRMCA
CERTIFIED
EPD

BUILD WITH STRENGTH

Who Do You Know?