



Wood frame Vs ICF: A Build to Own Case Study

KB Walker – *Your Concrete resource for ICF*



Introduction

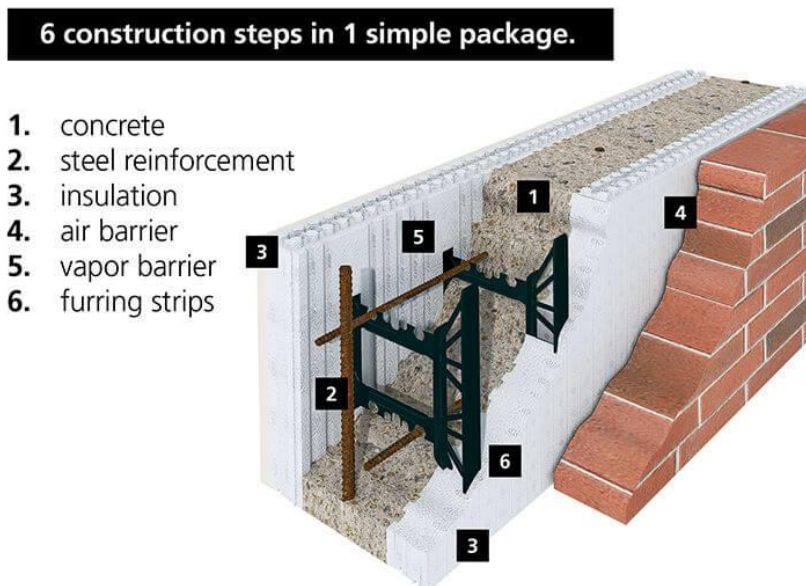
This report uses hard numbers from Bedford Development projects in Milwaukee, WI. Bedford exclusively uses insulated concrete forms (ICF) as their building system of choice.

Bedford moved to ICF construction after developing for many years using wood frame buildings. The data in this report is based on Dwell, Bay View (wood frame) and Walker's Point in Milwaukee (ICF).

There are four areas of analysis that will show increased NOI of over \$30,000 and over \$600,000 value at 5.5% CAP if ICF is used in place of wood frame.

1. Occupant Retention (**Page 3**)
2. Reserves and Deferred Maintenance (**Page 4**)
3. Energy Efficiency (**Page 5**)
4. Insurance (Builder's Risk & Annual Insurance) (**Page 6**)

Anatomy of an ICF wall system:



Retention

High STC Ratings

Annual turnover can be reduced by up to 25% using ICF over wood frame. Comfort, safety, and the efficiency of ICF over wood frame is the driving force in this reduction.

- Dwell (wood frame) sees 30-40% annual turnover
- Walker's Point (ICF) sees 15-25% annual turnover

Impact to NOI and Value at 5.5% CAP:

Math insight: 100 units per building, turnover and re-rental costs of \$500 a unit

- Dwell: \$15,000 - \$20,000 per year
- Walker's Point: \$7500 - \$12,500

\$7500 increase to NOI or \$136,000 of value at 5.5% CAP due to use of ICF

This is possible because of the STC ratings of ICF. Occupants are comfortable and relaxed.

STC Rating	Privacy Afforded	Construction Material
25-40	N/A	N/A
45	Loud speech barely heard	2x4" 16" O.C. Sound batt insulation in the wall. 2 layers of 5/8" drywall on both sides
50	Shouting barely heard	the above + resilient channel w/ studs spaced 24" O.C
55+	Shouting not heard	6" ICF form with monolithic concrete core. Testing shows rating of 67 when including 5/8" drywall with resilient channel installed

*Wall Assembly STC Performance" - National research council - The national academies of Sciences, Engineering, & Medicine, NA

Reserves / Deferred Maintenance

Minimal to zero wood present in building

By using ICF, Bedford Developments can reduce their reserves by 30% each year.

Math insight: 100 units per building, holding back \$250 per year per apartment

- Dwell - \$25,000 per year held back
- Walker's Point - \$17,500 per year held back

ICF adds another \$7500 increase to NOI or \$136,000 of value at 5.5% CAP

Why less maintenance?

- HVAC Reduction
 - Appropriate size systems for conditioning an ICF space are much smaller as the building envelope has exceptional thermal efficiency.
 - Smaller systems cost less up front, and cost less to repair
- Reduction in residential disaster impact
 - No wood for mold to grow on
 - No studs to absorb water damage
 - Unparalleled resistance to man-made disasters ([Link](#))
- Reduced wall damage
 - Complete backing support for drywall
 - Move in / out damages very minor
- Long term benefits
 - Walls do not deteriorate – completely un-biodegradable
 - Walls stay level & plumb – no settling
 - Compressive strength of concrete is higher than CIP. ICF forms provide the perfect curing environment. Compressive strengths of an ICF concrete mix can be around 5000psi

Energy Efficiency

The thermal mass of the monolithic concrete wall affords a conservative 50% savings in heating and cooling. Bedford developments do not pay for unit utilities but by using data from the common areas, the savings are apparent.

Math insight: 100 units per building. Average heating and cooling for common areas

- Dwell: \$30,000 per year
- Walker's Point: \$15,000 per year

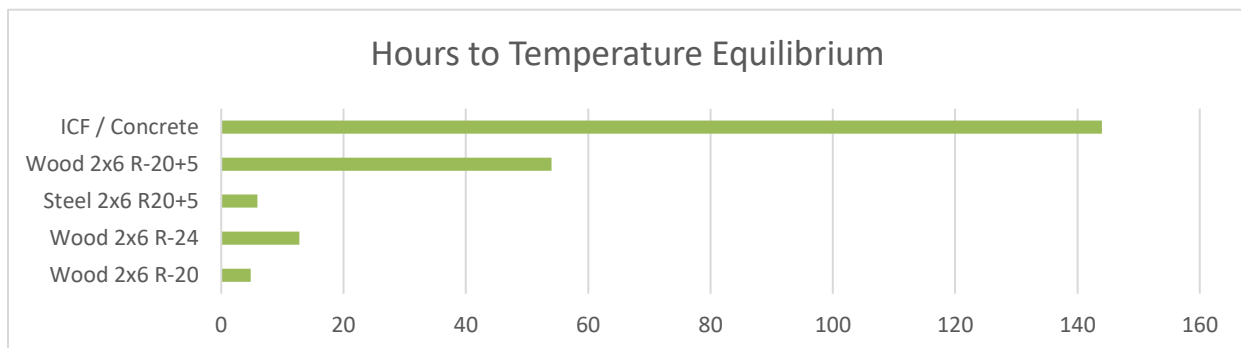
\$15,000 increase to NOI or \$272,000 of value at 5.5% CAP rate

How is ICF more energy efficient?

- Air Tightness
 - MIT architecture found 40 ICF houses to have a mean air tightness of 0.016in² /ft². This is less than 1 ACH. ([link](#))
 - Concrete core acts as an air barrier. Potential for WRB barrier install mistakes totally eradicated
- Continuous layers of EPS Foam
 - No thermal bridging takes place. Far less heat conductivity than wood studs
- Thermal Mass
 - Absorbs and stores energy. Concrete flattens out temperature fluctuations

Time to temperature equilibrium

Demonstrating the thermal mass effect is a Portland Cement Association (PCA) study. Testing ICF walls in negative 31f, ICF outperformed all other wall assemblies tested in time from a comfortable living temperature to equilibrium with outside temperatures. Protect your community, use ICF.



Annual Insurance Savings

Boston College building sciences was able to demonstrate a developer’s reduction for both builder’s risk insurance during construction and commercial property insurance during occupancy are drastically lower when using ICF compared to wood. For builder’s risk, the greatest difference found in quoted cost of insurance per location was 72% and the lowest 22%. For commercial property insurance the greatest difference was 65% and the lowest was 14%. [\(link\)](#)

To analyze Bedford Development’s holdings in Milwaukee, they show a 15% reduction on annual insurance premiums.

Math insight: 100 units per building with insurance costing \$400 per unit.

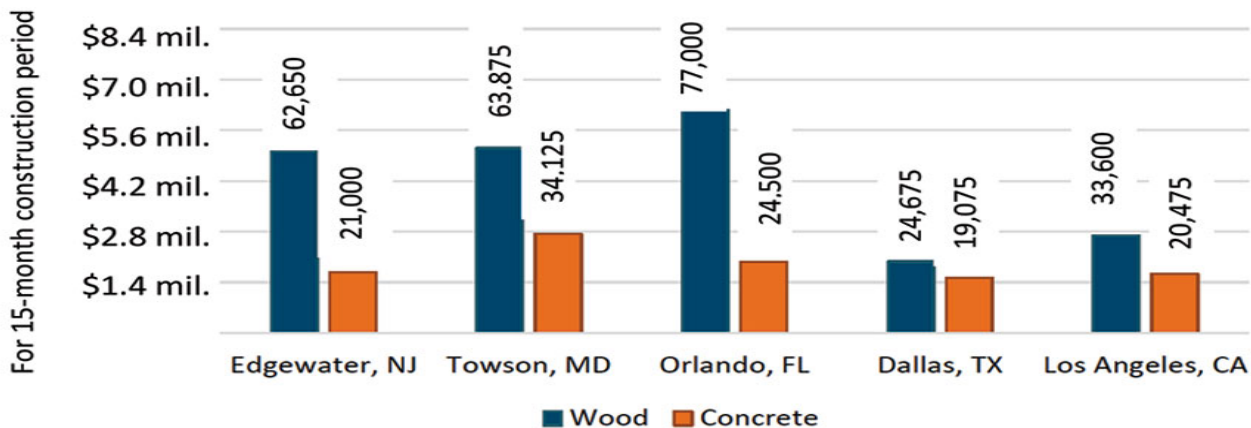
- Dwell - \$40,000 per year
- Walker’s Point - \$34,000 to \$36,000 per year.

\$4,000 to \$6,000 increase to NOI or \$72,000 to \$109,000 of value at 5.5% CAP rate

Why are insurance companies willing to insure for less?

- Disaster resilience
 - Non-combustible building material on site (sometimes zero wood)
 - ICF can withstand hurricane force winds (240mph) [\(link\)](#)
 - 6” ICF has a 4-hour fire rating
 - High likelihood the fire can be contained / never penetrate from neighbor building

Taking a \$14m apartment building and having an agent price out builder’s risk in various cities in the U.S, you can see the impact of having non-combustible material on site:



Win with Multifamily by using ICF

The cumulative effects

Occupant retention + savings in maintenance + energy efficiency + insurance saving =

Increased NOI by \$34,000 or \$618,000 to Value at 5.5% CAP rate

To note: Bedford developments bill each individual resident for their utilities. If an owner pays for utilities in a 100-unit apartment building, the increase in energy efficiency can see approximately \$60,000 boost to NOI.

Right: Dwell, Bay View.



Left: Walker's Point, MKE