Chapter 3
Building Envelope & Durability
Building Envelope

What does the Building Envelope Include?

1. Foundations
2. Thermal Envelope
3. Durability
Building Envelope
Foundation

Learning Objectives—Foundations

• What exactly is a foundation supposed to do?
• How is the foundation affected by water?
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Foundation

Concrete Slab
Gravel
Soil
Building Envelope
Foundation

Concrete slab
Reinforcing steel
Vapor barrier
Base
Subbase
Subgrade (soil)
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Foundation

Keep the Soil Gas Out
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Foundation

Sealing slab penetrations
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Foundation

Use a water vapor retarder

Crawl Space

Seal all penetrations
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Foundation

Masonry Weep Hole

Allow bulk water to get out

Brick Rowlock Flashing

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Building Envelope
Foundation

Drain water away from the foundation
Building Envelope
Foundation

Review—Foundations

- What exactly is a foundation supposed to do?
- How is the foundation affected by water?
Learning Objectives—Thermal Envelope

• What is the building envelope?
• What is an air barrier?
• How is that different from a moisture barrier?
• What is a thermal boundary?
Building Envelope
Thermal Envelope
Building Envelope
Thermal Envelope

How Does the Air Escape?
Air infiltrates into and out of your home through every hole and crack. About one-third of this air infiltrates through openings in your ceilings, walls, and floors.
Building Envelope
Thermal Envelope

Methods to Reduce Air Infiltration

Caulking
Weatherstripping
Foaming
Building Envelope
Thermal Envelope
Building Envelope
Thermal Envelope

Proper ventilation to remove moisture and cooking odors
A secondary water proofing membrane, under the finished roof reduces water and wind damage.
Another method for reducing water infiltration and for channeling bulk water

House Wrap

Furring Strips over House Wrap
Building Envelope
Thermal Envelope

Step 5: Flashing the Installation - Air Barrier Applications

- Drip cap
- Sealant
- Corner gasket
- Cut flashing at head jamb and fold back
- Lap flashing onto unit/casing
- Head jamb flashing lapped over side flashing
- Install flashing at head jamb to cover drip cap and membrane at jambs
- Install flashing to cover wrap and lap onto window jamb/casing
- Fold air barrier down over membrane

Figure 11 Sealing the Installation in air barrier applications.
Type I Vapor Retarders
(0.1 perms or less)

Type II Vapor Retarders
(>0.1 and ≤ 1.0 perms)

Type III Vapor Retarders
(>1.0 and ≤ 10 perms)
Building Envelope
Thermal Envelope

Types of Wall Insulation

Reflective Insulation
Masonry Wall

Batt Insulation
Frame Wall

Foam Insulation
Frame Wall

Foam-in-Place
Masonry Wall

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Building Envelope
Thermal Envelope

Review—Thermal envelope

• What is the building envelope?
• What is an air barrier?
• How is that different from a moisture barrier?
• What is a thermal boundary?
Learning Objectives—Durability

• Define durability

• Durability applies to more than just the building.

• What is sustainability, and how is it different from durability?
Building Envelope Durability

Why focus on Durability?

• Avoid warranty claims and callbacks
• Reduce the need for costly repairs later on
• Sustainability is not possible without durability
Sustainability

“Simply Stated, the ability to meet needs of our present generation, without compromising the needs of our future generations.”
Building Envelope
Durability

Safe Room

Extra brackets

Extra framing

FORTIFIED
...for safer living.

A program of the Institute for Business & Home Safety
Building Envelope
Durability
Building Envelope Durability

Types of Attic Baffles – Soffit Ventilation

Foil Baffles

Plastic Baffles

Cardboard Baffles
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Hurricane-reinforced

Heavy-duty multi-chambered vinyl frame
Impact-resistant laminated glass
Third piece of glass for insulation
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Not Approved as Shutters in Miami-Dade County...

Approved Shutters
Building Envelope Durability

WIND ANALYSIS — 120 MPH

Job Address:
Cooper 2002 Walscale

Contractor:
Premier Construction

Prepared By:
HR ENGINEERING & CONSTRUCTION

Hiring File #:
12031-001-000

Importance Factor: 1.0
Internal Pressure Coefficient: -0.91, -0.18

Pipes may be used in a manner not by the above conditions: Yes or No (Circle One)

Schedule D Top Plate: 5/8
Steel Species: No

Roof Slope: 3:12
Shingle Species: N/A

Min. Roof: 10/12
Max. Overhang Length: (projected overhang) 24"  

Model V @ End Zone: H/C

Model # 8 @ Interior Zone: H/C

KEY TO DIAGRAM:

LOCATION (See Sheet 1, below)

FAS

FAS

STOP

STOP

48" D.C. (TOP)

"F and E" Cutout to Length Sheathing in Line of RSP4(1) No. Must be 100% Continuous. All Exterior Walls as indicated on Drawing Provided

Typical Nailing Pattern for Sheathing is Line of Straps" (SEE DRAWING ATTACHED)

A-NOS. 3006, 1/2" dia., 4" Long @ 2" centers. Along Wall from Left Center 12".

3/8" HD WASHERS IN PORCH COLUMNS Spacing 64" o.c.
Building Envelope

Durability

Secondary water barrier on roof
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Issue: Standing Water
- Grade for proper drainage

Garage floor below living floor

Permit indicates home not in 100 year floodplain
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Durability

Fire resistant materials
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The Green Difference: Residential Fire Sprinklers and the Environment
Building Envelope Durability

Reduce pest infestations
• Seal floor penetrations
• Move plants/turf minimum of 2 feet from foundation
• Place sprinklers/emitters 2 feet from foundation
Building Envelope
Durability
The boron-based flame retardants have the added benefit of being toxic to insects and other pests that might be attracted to your home.
Building Envelope

Durability

Overhangs, gutters and downspouts
Building Envelope
Durability
Building Envelope Durability

Certified Florida Green Home

5483
Certificate #

151
Score

1/7/2013
Date

Cindy Hall
President, Florida Green Building Coalition

Certifying Agent, Florida Green Building Coalition

This certification is provided by an individual who has been accredited by the Florida Green Building Coalition to perform Green Home Evaluations. Any questions, comments, or complaints regarding the individual performing this service may be directed to the Florida Green Building Coalition.
Building Envelope Durability

Home Owner’s Manual

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Building Envelope Durability

- New homes built today are expected to last at least 75 to 100 years
- Materials used in homes need to be durable.
  - Inherent material characteristics make them more durable.
  - Design, installation, and treatment of materials is what truly enhances durability and creates a material’s greatest efficiency.
Building Envelope Durability

Review—Durability

• Define durability
• Durability applies to more than just the building.
• What is sustainability, and how is it different from durability?
THANK YOU

Questions & Answers
FLORIDA RESOURCES

Florida Green Building Coalition
http://www.floridagreenbuilding.org/

Two Trails - http://www.twotrails.com/

Masonry Association of Florida
http://www.floridamasonry.com/

Fi-Foil Company, Inc.
http://www.fifoil.com

As well as your local Home Builders Association