

Energy Efficient Building Envelope

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COURSE SYLLABUS

Even as technological innovation creates new construction possibilities, incorporating energy-efficiency into building projects can not only provide a better quality of life, but also conserve dwindling natural resources. Properly integrated design strategies can contribute to essential envelope performance requirements. This one hour video course will help builders identify important considerations and then apply those principles to a specific project.

By the end of this course, students will be able to:

- Describe how a properly constructed building envelope will keep out weather related moisture and stop uncontrolled movement of energy due to loss of conditioned air.
- Identify a variety of energy and resource efficient products and systems available.
- Explain some of the cost savings in both labor and materials associated with energy efficient systems.

This online course is presented in a video format. Students should review the videos and the corresponding text. Students must receive a score 70% or better on the quiz in order to receive credit/certification for the course.

COURSE OUTLINE

Advanced Framing Techniques

(Video length 17:15 minutes)

***Learning Objectives:** 1) What is advanced framing, and what are some of the techniques used? 2) List the uses of insulated headers and energy heel trusses. 3) Understand the benefits of pre-fabricated walls.

I. Advanced Framing Techniques

- A. 2 x 6 studs
- B. Headers
- C. Raised Heel Trusses

II. Raised Heel Trusses

- A. Full height insulation
- B. Cost efficient

III. Double 2 x 4 Walls

- A. Thicker insulation
- B. Drawbacks

IV. Prefabricated Walls

- A. Reduced waste
- B. Higher quality

Air Barriers

(Video length 19:18 minutes)

***Learning Objectives:** 1) Apply the benefits of energy efficient building. 2) Describe the purpose of air barriers and what materials are typically used. 3) List the uses of SIPs and ICFs.

I. Design and Implementation of Energy Efficient Design

- A. Design phase
- B. Subs and employees
- C. Training

II. Air Sealing

- A. Finding leaks
- B. Materials

III. Airtight Drywall

- A. Methods
- B. Drawbacks

IV. Prefabricated Walls

- A. Reduced waste
- B. Higher quality
- C. SIPs
- D. ICFs

Insulation

(Video length 18:33 minutes)

****Learning Objectives:*** 1) Recognize the pros and cons of fiberglass and cellulose insulation material. 2) Describe the proper installation of fiberglass insulation. 3) Apply proper installation of cellulose insulation.

I. Fiberglass Batts

- A. Uses
- B. Various configurations: high density, standard density
- C. Installation

II. Cellulose Insulation

- A. Uses
- B. Various configurations: dense packed, dry spray

III. Roof Installation

- A. Methods
- B. Baffles

Foam Insulation/Sheathing

(Video length 22:59 minutes)

***Learning Objectives:** 1) Identify different types of foam insulation available. 2) Understand the pros and cons of polyisocyanurate and polyurethane spray foam. 3) Demonstrate the many uses of both EPS and XPS insulating sheathing.

I. Spray Foam

- A. Urea Formaldehyde
- B. Cementitious
- C. Phenolic
- D. Polyisocyanurate or polyiso
- E. Polyurethane

II. Various configurations

- A. Open cell, Closed cell

III. Insulating Sheathing

- A. Uses
- B. Examples: expanded, extruded