

## Alternative Housing

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## Why build an alternative house?

- Energy savings
- Building cost savings
- New innovative design

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## Alternative Types

- Earth Sheltered Dwellings
- Geodesic Domes
- Insulating Concrete Forms (ICF)
- Structurally Insulated Panels (SIP)

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## Earth Sheltered Dwellings

- Considerations
  - Orientation to sun and wind
  - Topography
  - Soil type
  - Groundwater level

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## Domes

- Structural Superiority
- Unobstructed floor space
- Low cost
- Reduced energy needs



Picture from Metal Home Digest Nov/Dec 2007

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Pictures are courtesy of Architecture Residential Drawing and Design

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### Insulating Concrete Forms

- Foundations
- House walls
- Benefits:
  - High R-values (R-17 to R-26)
  - Reduced air infiltration
  - Reduced noise infiltration
  - Structurally sound (wind, seismic)
  - Fast and straightforward assembly
- More information: [www.forms.org/index.php?act=projectfiles](http://www.forms.org/index.php?act=projectfiles)

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### Insulating Concrete Forms

- Costs run up to 10% more than frame construction (\$1.75 to \$3.50 per ft<sup>2</sup>) with skilled labor and special equipment being factors
- Design covered by a prescriptive code in most
- ICFA sells Prescriptive Method for Insulating Concrete Forms in Residential Construction (2nd Edition)



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### Structurally Insulated Panels

- New churches
- Offices
- Homes

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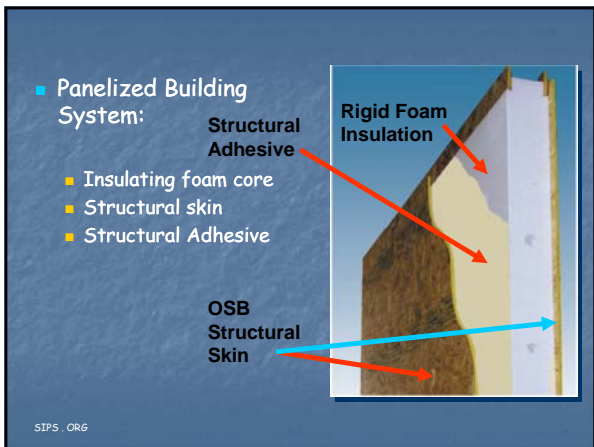
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### WHAT ARE SIPS ?



SIPs ARE A COMPOSITE STRESSED-SKIN PANEL WITH AN INSULATING CORE OF RIGID FOAM - USUALLY EPS OR POLYURETHANE - AND "WORKING" SKINS MOST COMMONLY OF 7/16" THICK ORIENTED STRAND BOARD (OSB).

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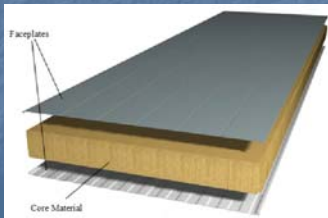
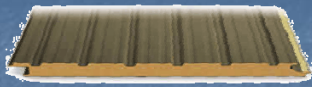
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### THEY ARE ALSO AVAILBLE WITH METAL SKINS.....



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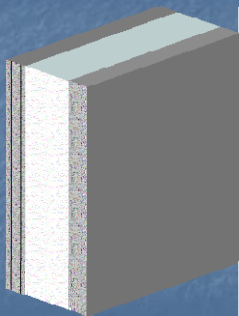
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### .....AND CEMENTITIOUS OR COMPOSITE SKINS



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RIGID FOAM CORE MATERIALS MAY BE:

- 1. EXPANDED POLYSTYRENE (EPS)
- 2. EXTRUDED POLYSTYRENE (XPS)
- 3. POLYURETHANE
- 4. POLYISOCYANURATE



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Manufacturing Process

- 1. Design
  - AutoCAD
  - Shop Drawings
- 2. Fabrication
  - CNC
  - Hand Cutting
  - Cut to specific design of structure
- 3. Shipped to jobsite - ready to install
- 4. Complete packages available with additional components installed



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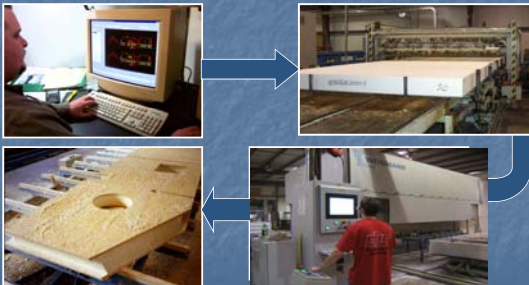
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CAD/CAM

SIP Software converts SIP CAD drawings into Machine instructional code.



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1. Starts with any CAD drawing



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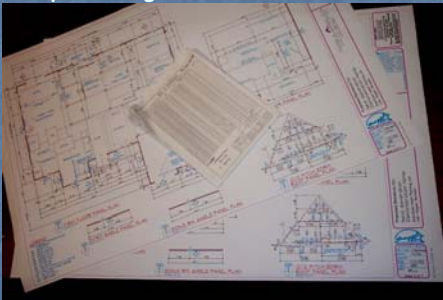
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2. SIP Software converts elevations into shop drawings and material lists



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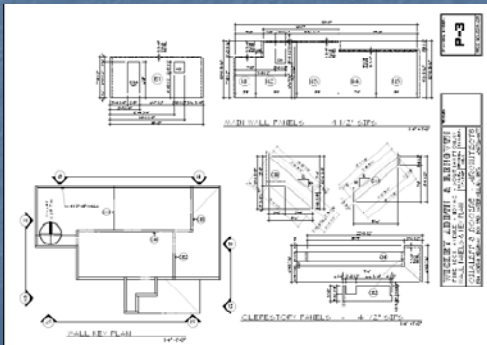
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2.1. OR...the Project Architect or Engineer create their own SIP drawings



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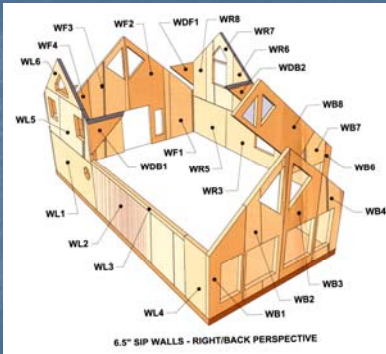
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### 2.1.1. or three dimensional drawing



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## SIP APPLICATIONS

WALLS -- ROOFS -- FLOORS

Thicknesses:

walls 4" 6"

roofs 8" 10" 12" and 14"

floors 10"-12" Custom

Sizes 4'x8,' 8'x24,' and 9'x24' Custom

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### SIP R - VALUES

EPS Core Thickness	3 5/8"	5 5/8"	7 3/8"	9 3/8"	12 3/8"
R-Value @ 75° F	15.34	23.04	29.77	40.36	49.02
@ 40° F	16.57	26.26	32.28	43.80	53.23
@ 25° F	17.15	27.16	33.46	45.42	55.21

(Calculated R-Values) Calculated R-Values are for a generic Structural Insulated Panel, and include 2 sheets of 7/16" OSB at .69 per side, Type I, Expanded Polystyrene Foam that meets ASTM C - 578, calculated per ASHRAE published values at 3.85 per inch at 75° F, 4.19 at 40° F and 4.35 at 25°. Mean temperatures are established for differing regions and occupancies. Please consult your local jurisdiction for interpretation of Regional or National Model Energy Code Requirements.

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### Applicability Limits

- Wall Panels Only
- 4-1/2" and 5-1/2" Thick Panels (Nominal)
- 40 Foot x 60 Foot Building Size
- Up to Two Stories Above a Basement
- 10 Feet Max. Wall Height
- 130 mph Wind Speed
- 70 psf Ground Snow Load
- Seismic Design Category A, B, and C

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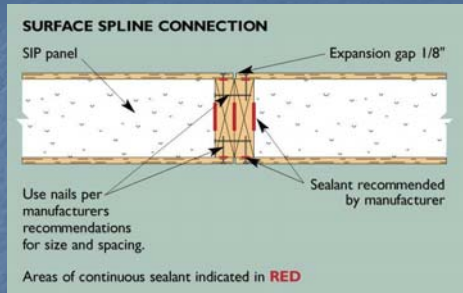
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### Current Industry Assembly Standards



STRUCTURAL SPLINES MAY BE SINGLE OR DOUBLE OR SINGLE MEMBERS 3 1/2" WIDE, SUCH AS PARALLAMS OR OTHER COMPOSITES.

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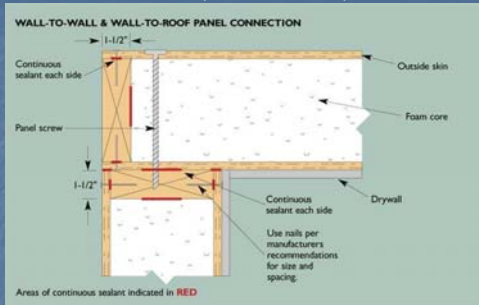
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### Current Industry Assembly Standards



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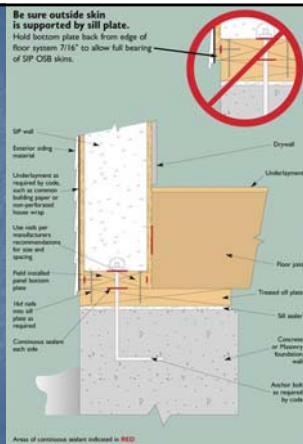
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### Current Industry Assembly Standards



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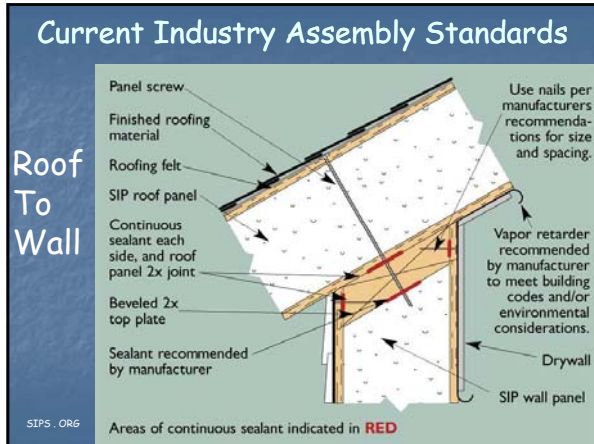
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