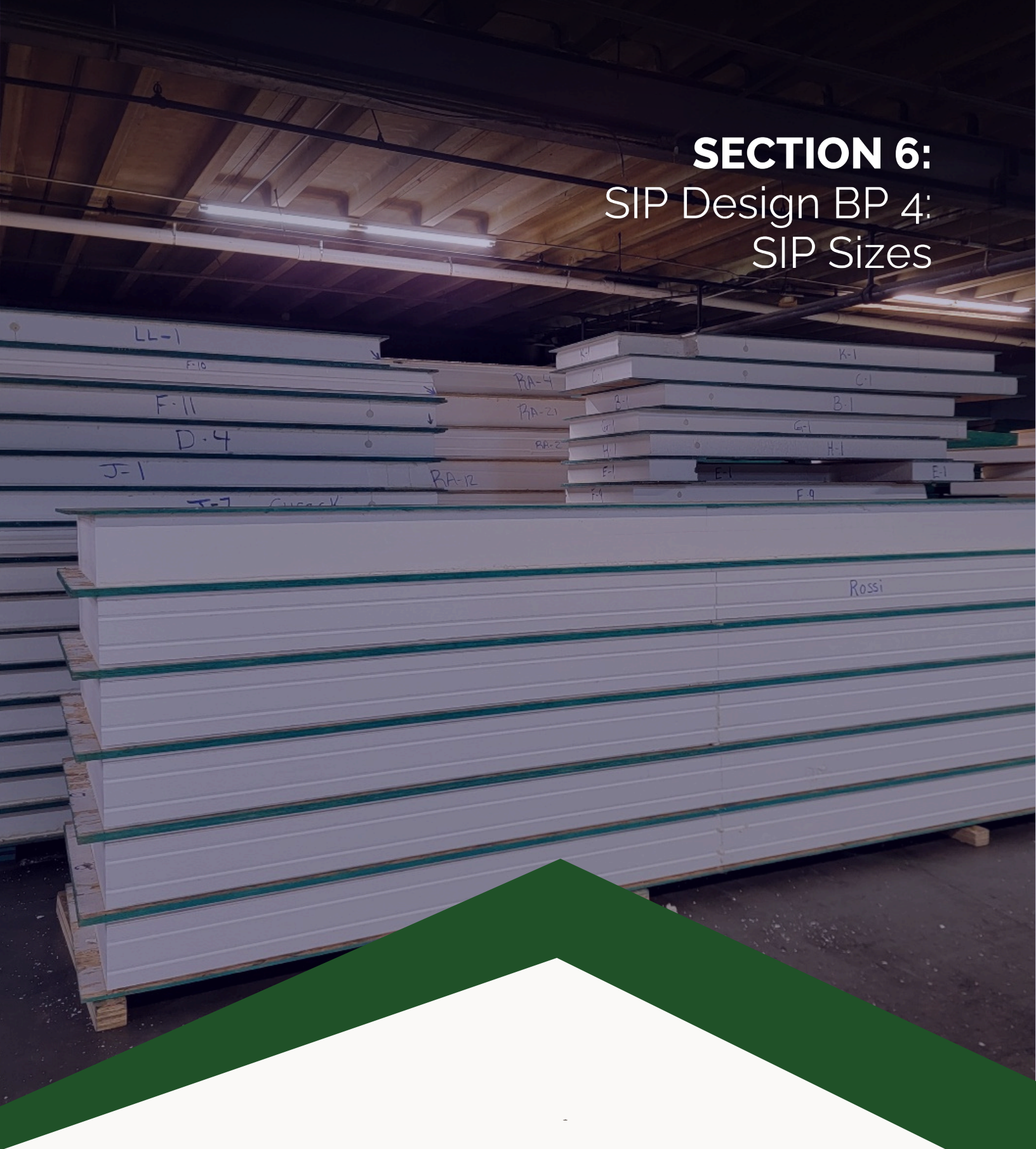

SECTION 6:
SIP Design BP 4: SIP Sizes

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SIP DESIGN-BP 4:

SIP Sizes

This document is created specifically for design professionals by the manufacturing members of the Structural Insulated Panel Association (SIPA). It dives deeper and provides more background into each of the summarized topics presented in the *Design with SIPs: DESIGN CONSIDERATIONS* overview which highlights important considerations during the design phase of a Structural Insulated Panel (SIP) structure. Decades of combined knowledge from SIPA manufacturers will help reduce the learning curve and leverage SIPs' exceptional qualities to achieve the high-performance results owners expect when building with SIPs. The considerations of how and why the best practices were developed as the common industry platform for SIP design are explored here.

The index below outlines ten topical areas, listed in sequence to match the order of design considerations and construction. The details in each chapter provide a deeper understanding of the subject matter to facilitate successful SIP design and later implementation. The current chapter is highlighted in blue.

SIP DESIGN-BP 4:

SIP Sizes

SIP DESIGN-BP 4.1:

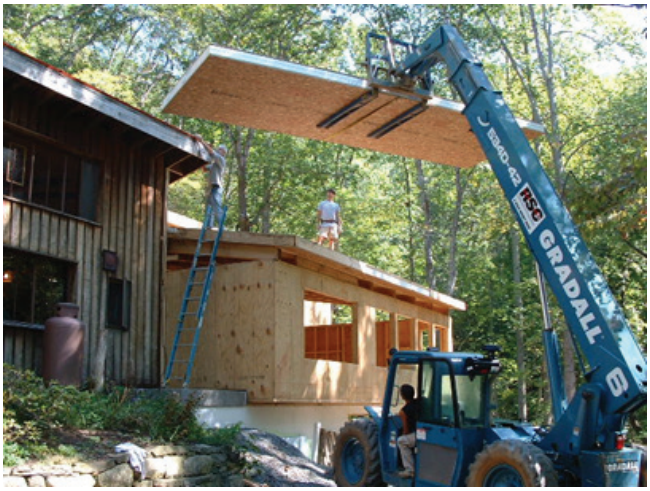
Use support spacings of 4', 8', 12', 16', etc. to maximize efficiency of SIP layout and to reduce costs, and SIP DESIGN-BP 4.3: SIPs provide for long spans which may eliminate some conventional roof supports.)

SIPs are commonly manufactured in nominal 4-1/2-inch, 6-1/2-inch, 8-1/4-inch, 10-1/4-inch and 12-1/4-inch thicknesses. The 4-1/2-inch and 6-1/2-inch-thick SIPs are typically used for walls. The thicker SIPs are typically used for floors and roofs. SIPs can be manufactured in sizes ranging from 4' x 8' to 8' x 24'. This versatility in sizes offers the design professional a wide range of options to satisfy virtually any design situation including spanning from 4 feet to 24 feet without intermediate supports as are often required for other stick framing systems.

As examples, in accordance with the SIPA ICC-NTA code listing report, a 6-1/2-inch-thick SIP can be used to span 8 feet carrying 56 psf for floors at a deflection limit of L/360 which is adequate for most residential floor applications. The same thickness SIPs can carry up to 80 psf for roofs at a deflection limit of L/180 which is adequate for most roof snow load situations in the U.S. The use of a 12-1/4-inch-thick SIP can carry up to 106 psf for an 8-foot span for either a floor or roof application.

SIPs used in roofs offer even greater design flexibility to span long distances. For longer span roof applications up to 24 feet, lumber splines or I-joist splines are typically used. Sizes for these SIPs are typically limited to 4' x 24'. A single SIP that is 4' x 24' in cross section used in a roof application covers 96 sq. ft. with no intermediate supports required. A roof using traditional lumber or I-joist framing members would require multiple framing members spaced 16 inches or 24 inches on center to accomplish the same area of roof coverage. Thus, the use of a single SIP offers considerable savings in labor/installation costs.

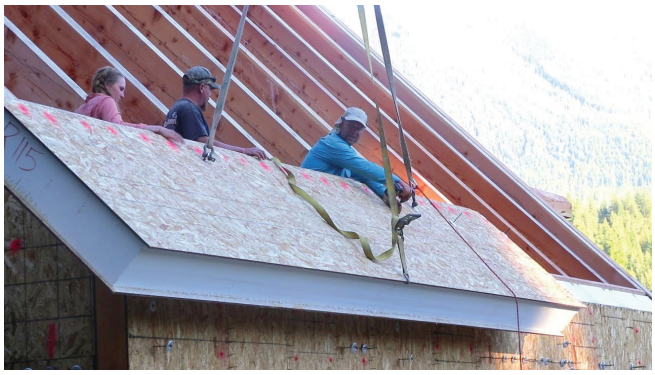
The design professional is advised to verify span/load capacities from manufacturer-specific code listing reports and other design literature for these applications, as load capacities vary from manufacturer to manufacturer for different SIP thicknesses and spline types.



SIP DESIGN-BP 4.2:

SIP roofs are supported by structural elements, either parallel or perpendicular to the ridge. Orientation is a function of the support elements and the spacing.

SIP roofs can offer great design flexibility. SIPs need to be supported in either a single span or multi-span design, typically a minimum of 1-1/2-inch of bearing required. Exterior walls, glulam beams (ridge and mid-span), purlins, interior partition walls, timber frame, or roof trusses constructed of either wood or steel can be used to support SIPs. This allows the SIPs to be oriented in either a parallel or a perpendicular direction to the ridge. SIPs can span up to 24 feet when combined with structural splines (I-joists, double 2x or LVLs). To utilize the large 8' x 24' SIPs, design the support system using the SIP manufacturer's load charts to ensure SIP spans are achievable. SIP support in valley or hip situations can be achieved by incorporating structural members inside the SIPs for shorter spans or using support under the SIPs for longer spans and to simplify installation.



SIP DESIGN-BP 4.3:

SIPs provide for long spans which may eliminate some conventional roof supports.

Please see commentary above under SIP DESIGN-BP 4.1.

SIP DESIGN-BP 4.4:

Wall thickness will generally increase when using SIPs over conventional construction. Extension jambs may be required for window and door detailing.

Typically, SIP wall nominal thicknesses are 4-1/2-inch and 6-1/2-inch. The EPS core thickness for these nominal wall thicknesses typically correspond to dimensional lumber sizes of 3-1/2-inch and 5-1/2-inch. The typical OSB facer used with SIPs is 7/16-inch in thickness. This equates to a SIP wall thickness that is marginally thicker than the conventionally framed wall (without continuous insulation "ci") due to the second layer of OSB used in the SIP wall.

What this means for the design professional is that jamb thicknesses for window and door openings in a SIP wall will need to be nominally 7/16-inch thicker than for a conventionally framed wall. Window and door manufacturers can accommodate this additional thickness of the wall without any issues, but they need to be aware of this condition so they can supply the proper size extension jambs.

If OSB thicknesses different than 7/16-inch are used for the SIP wall panel facers, the corresponding thickness of the wall will vary. The design professional is advised to consult with the specific SIP manufacturers selected for the project to verify the overall SIP wall thickness based on the specific project requirements.

Glossary of Terms

Continuous Insulation (ci): insulating material that is continuous across all structural members without thermal bridges other than fasteners and service openings. It is installed on the interior, exterior, or is integral to any opaque surface of the building envelope.

Glulam: an engineered wood.

OSB: oriented strand board, an engineered wood product.

PSF: pounds per square foot pressure unit

SIPA: Structural Insulated Panel Association (www.sips.org), a non-profit trade association representing manufacturers, suppliers, dealer/distributors, design professionals, and builders committed to providing quality structural insulated panels for all segments of the construction industry.

SIPs: Structural Insulated Panels, a high-performance building component for residential and light commercial construction.

Spline: connection system used to connect two panels together at vertical, in-plane joints. Many different spline systems are available including box/block, surface, I-joist, dimensional lumber and engineered lumber.

Structural Splines: I-joist, double 2x, or engineered lumber like LVL.

Structural Members: a load-carrying element.

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