COMBAT THE INDUSTRY STORM Build Superior Structures Faster & Economically With One Building Envelope Assembly.

PREMIER SIPS STRUCTURAL INSULATED PANELS

Construction Innovation Over 145 Years



1877

2024

We are designing and building with 150 year old technology.

Meanwhile in 150 years...



Critical Elements That ARE Changing

There is a "perfect storm" brewing that's forcing change:

- 1. Inconsistent building material **QUALITY**
- 2. Skilled LABOR shortages
- 3. Unpredictable material **COSTS**
- 4. Increasing energy **CODE** requirements
- 5. Need for more **RESILIENT** structures
- 6. Consumer demand for **HEALTHY** environments





We all feel it ... old practices are not overcoming these challenges

Storm of Challenges Aren't Going Anywhere

Skilled-labor shortages & lack of material quality

- 72% of general contractors say labor shortage is biggest hurdle
- 81% of construction firms have trouble filling all positions
- Retirements will drain talent: 41 % of US construction set to retire by 2031
- Labor costs projected to continue to grow at 3-5% annually

Demand is outstripping supply: Supply chain issues, low inventory and growing demands = material shortages & increased costs.

- 72% of U.S. freight moves by trucks, ATA says country is short 80,000 drivers
- Low housing inventory & construction costs are expected to continue to rise at a steady rate indefinitely g demand will continue well beyond '24 (NAHB)
- & costs remain high (20%) compared to pre-pandemic levels





Challenge: The Storm Isn't Going Anywhere

Building & energy codes work to reduce carbon emissions & address building durability & resiliency

- Buildings account for ³/₄ of U.S. energy consumption & 40% of carbon emissions
- U.S. is working towards carbon neutrality by 2050, and 2021 code changes and incoming 2024 updates are making fast changes
- Natural disasters have increased over 220% over the last 3 decades, and building codes have changed to require stronger, more durable structures

The global pandemic has made **health** & wellness a priority.

- COVID infection is airborne, making indoor clean air/environments critical
- 20% of households have someone with asthma, allergies or respiratory ailments
- Indoor air is typically 2-5x more polluted than outside air, the building envelope plays a huge role in indoor air health





One Solution To The "Storm" of Challenges Exists!

PRESENTATION FOCUS:

A code approved building envelope assembly exists to combat ongoing industry challenges: SIPS (Structural Insulated Panel Systems)

While new to some, SIPS envelope assemblies aren't new technology.

Early adopters have built thousands of structures with SIPS over the past 80+ years.



SIPS Solve Challenge #1: Maintaining Quality



Offsite Design & Construction Booming



Offsite construction is growing rapidly.

- In the past 5 years the use of off-site building envelope systems has doubled
- Projected to grow to \$110B by 2025, driven by lack of skilled labor and increase in cost-cutting technologies
- North American builders say they plan to pare down onsite construction to just 25% by 2025 in favor of off-site construction





Quality: Material Differences



Site-Framed Assemblies

(Long dry-in time & unpredictable quality)



Offsite Panelized Assemblies

(Precision off-site fabrication & built-in quality control)



APPLIES TO RESIDENTIAL & COMMERCIAL PROJECTS

Quality: Lumber vs Engineered Materials



There's only so much a skilled builder can do!





Leave a legacy of quality with each building you design and build by choosing engineered products



Quality: Lumber vs Engineered Materials



Which Would You Rather Design With?

Site-Framed Assembly Lumber

Offsite Panelized Assembly

OSB, I-Joist, LVL



Old-growth and new growth studs Cupped, Bowed, Unstable. Engineered, Predictable, Straight & Stable

Offsite Construction Benefits



- Regulated Precision Fabrication
- Mandatory Quality Control Standards (Don't occur in the field)
- Rigorous Testing For Building Code
- Fewer Skilled Laborers For Installation
- Optimized Material Use for Significant Jobsite Waste Reduction
- Predictable, Engineered Outcome



Before We Go Further - What is a SIP System?



Panelized Roof, Wall, & Floor Building Envelope Assemblies [Panel System = Sheathing + Insulation + Air Barrier]

- Structural Grade Jumbo OSB: Facers are structurally laminated (same process as a glulam beam) to a solid insulation core.
- Rigid Insulation: EPS (Expanded polystyrene not Styrofoam!) or GPS (Graphite enhanced) is manufactured without harmful blowing agents, so there is no off-gassing enabling long term thermal stability.
- NOTE: Insulation is so strong it is used as Geofoam below freeways, bridges, etc. & is made from a steam expansion process without harmful chemicals



PROVIDE PERFORMANCE: SIPS Offer Structural & Thermal Warranty



- EPS & GPS insulation thermal values are 100% warranted for 50 years
- Premier SIPS come with a 20-year structural warranty

Won't see a warranty with site framed lumber + fiberglass assemblies!



This Form of SIP Building Envelope Isn't New

CHALLENGE #4

CHALLENGE #5

Used for 80+ Years in Thousands of Structures

• Panelized (offsite construction) building envelope solutions like SIPs have been around since 1935.

CHALLENGE #3

 Famed architect Frank Lloyd Wright used SIPs in some of his affordable Usonian Houses built in the 1930-40's in Michigan, and still stand today.

CHALLENGE #2





CHALLENGE #1

SIPS Solves Challenge #2: LABOR Shortages



Why Minimizing Trades is Critical: Availability



LABOR: Reduced Trades



Trades Eliminated With SIPS

- Framing
- Insulation
- Air Sealing/Air Barrier

Trades Reduced Scope of Work With SIPS

- Drywall
- Finishes/Trim
- Inspections/Testing
- Site Clean-up/Waste Removal



LABOR: Reduce Skilled Labor & Increase Productivity



A SIP install crew can cut framing time and labor costs by up to 55% compared to conventional wood framing.



Jackson Hole, WY builder has refined his SIP install & has cut framing install labor by 80%





LABOR: Faster Install & Dry-In With Reduced Labor

CHALLENGE #1 CHALLENGE #2	CHALLENGE #3 CHALLENGE #4	CHALLENGE #5
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- SIPS arrive at jobsites prefabricated per your plans
- Windows and doors are pre-cut, electrical chases pre-drilled
- Large jumbo panels (up to 24'x8') tilt/move into place & connect to the neighboring panel (like a jigsaw puzzle)
- Customized layout drawings show how to assemble panelized sections



- Premier offers job start training for new crews to show how minimal measuring, cutting required!
- Manch Elementary School in Las Vegas saved \$1M on electrical install because of factory cut electrical chases in SIPS.





LABOR: NEW!!!! SIPs Reduce Labor With New Codes



SIPS Solves Challenge #3: Increasing Material Costs



SIPS Manage Costs & Create Value



The solution to managing costs, while increasing value is three-fold:

- 1. Manage supply chain unpredictability With Offsite panelized construction strategies ... We just covered this!
- Reduce Lumber Costs by lowering the framing factor
 % of wall where wood studs displace insulation. SIP building envelope is 3-5% lumber vs 22-24% for on-site framing assemblies. SIPS have 80% less lumber!
- 3. Optimize Projects through design innovation for end user value [Without added costs!]

LOWER COSTS: Reduce Lumber "The Framing Factor"



Comparison of typical lumber needed in framing assemblies



Common studs not needed in SIPs

A Visual Depiction: SIPs have approx. 80% less lumber

LOWER COSTS: Reduce Lumber Waste Expenses



Dimensional lumber is expensive to throw away!

- Typical Residential Home Construction Waste: 8,000 lbs./ 50 Cu. Yds.*
- Commercial projects = greater waste.
- Offsite construction optimizes materials & reduces waste in factory setting
- Result: 30% average savings on jobsite waste disposal costs





*Source: NAHB Study

ADD VALUE: Trade Below Grade For Above Grade



BALANCE COSTS: Post Project Cost Savings



Factory Engineered SIPs are straight and plumb, higher quality structures that reduce Builder call backs:

- Nail-pops from lumber drying/shrinking
- Windows & doors sticking due to out of square framing
- Cracked exterior stucco and interior drywall and bowed walls.





How much do project call backs cost you?

BALANCE COSTS: Decrease Cycle Times



SIPs decrease cycle time, improve schedule efficiency, which can result in less interest on construction loans:



ADD VALUE: End User Value & Financial Flexibility



Energy Efficient SIPS Construction:

- Lower energy bills = Affordability
- ~ 20% Increased appraisal and home values
- Lower insurance rates for energy efficiency & strength
- Premium product!



REDUCE COSTS: HVAC System Downsizing



- Lower energy demands = HVAC System downsizing
- Significant HVAC system cost reduction

Typical SIP HVAC sizing is half of a stick/site-framed assemblies

- Stick frame assemblies = 1 ton per 500 sf
- SIP residential = 1 ton per 1000 sf



BALANCE COSTS: New Federal Tax Incentives (IRA '23)



SIP Structures qualify for FEDERAL Energy Tax Incentives

(FREE MONEY! Inflation Reduction Act)

- Residential New Construction Available to Builders
 - Zero Energy READY (ready for solar!): \$5,000 per unit
 - Energy Star: \$2,500 per unit
- Commercial New Construction Designers & Owners Only
 - \$2.50/sf Tax Credit (25% + code improvement)
 - \$5.00/sf Tax Credit (50% + code improvement)
 - Applicable every 4 yrs. (as improvements made)

BALANCE COSTS: Regional Utility Incentives



SIP Structures qualify for REGIONAL energy efficiency incentives that ADD UP!

- State, county, city
- Private utilities

Challenges 1, 2 & 3 Tackled!



SIPS aren't your average building envelope assembly. How else can you maintain quality, build faster, balance costs and deliver a superior end-product?

Many enthusiasts refer to SIPS as the "Ferrari" of the building industry, but without the massive price tag.



NEXT UP: Challenge #4

SIPS Solves Challenge #4: Meet New Codes



Meet 2021 & 2024 Energy & Building Codes Now



Structural Insulated Panels meet and/or exceed:

- ICC Code Reports (NAHB/ICC 700)
- IECC Continuous Insulation Compliant (up to 60% energy reduction)
- Recognized in ICC ESR's for compliance to the IRC & IBC
- ASTM material property standards*
- ICC-ESR and ESL recognized for Seismic Zones D,E & F*
- Florida Product Building Code Approval for High Velocity Hurricane Zones* Not all manufacturers
- California TITLE 24 Compliance (Most stringent in the nation!) Net-Zero Code



INTERNATIONAL Standards Worldwide





INTERNATIONAL **RESIDENTIAL** CODE[®] for One- and Two-Family Dwellings



PROVIDE PERFORMANCE: Meet Energy & Building Codes



SIP building envelopes easily meet or exceed increasing energy & building codes requirements because of two key attributes:



Airtightness Durability (Resilience)



ENERGY PERFORMANCE: Measure Through Envelope Airtightness



When uncontrolled air moves through the building envelope, this air movement can cause as many as 5-20 air changes per hour.

Uncontrolled air makes heating and cooling a structure inefficient, uses more energy, wastes natural resources and creates more pollution.



ENERGY PERFORMANCE: Create Energy Tight Envelopes – With Factory Precision

CHALLENGE #5

CHALLENGE #4



1ST WAY ENERGY ESCAPES is Air Transfer because of:

- Poorly fit framing members in site framed assemblies
- Poor sealing of connections and apertures within the envelope

CHALLENGE #3

- Mis-applied water & air barriers
- Loose fitting windows/doors

CHALLENGE #2

CHALLENGE #1



ENERGY PERFORMANCE: Create Energy Tight Envelopes – With Factory Precision

CHALLENGE #5

CHALLENGE #4

2nd WAY ENERGY ESCAPES is Convective Looping:

CHALLENGE #2

CHALLENGE #1

 Warm moist air moving from low to high in the wall cavity, wasting valuable energy

CHALLENGE #3

 Steel & wood studs with batt insulation is particularly susceptible to heat loss and moisture condensation due to air moving slowly through the batt insulation



Arrows = Convective Looping

ENERGY PERFORMANCE: Combat Thermal Bridging



3rd WAY ENERGY ESCAPES is Conduction/Thermal Bridging:



ENERGY PERFORMANCE: Continuous Insulation Code Requirement Met



With a reduced framing factor and thermal bridging SIPs meet sections C402 & R402 of the 2021 IECC for thermal envelope requirements and eliminate the need for additional continuous insulation.



... 2024 code is in the sidelines.



ENERGY PERFORMANCE: Beyond Product R-value to Whole-Wall R-value



Performance extends beyond product R-value:

- Whole Wall R-value accounts for the full assembly and the true values of components together.
- Testing has proven that SIP assemblies, with rigid insulation cores, have the highest and most stable long-term thermal values.



ENERGY PERFORMANCE: Performance (U-Factors) vs. Prescriptive (R-value) Path



- ✓ Using the Performance Path & "U-Factors" with SIP building envelope assemblies helps exceed energy & buildings codes with less materials
 - SIPS meet code at R-38, where ceiling insulation in other assemblies require R-60. Don't over build!
 - U-Factor performance path evaluates energy efficiency in balanced, full system approach.

Optimize projects with SIPS as a system to realize the most savings & value.

2021 IECC TABLE R402.1.2 EQUIVALENT U-FACTORS ¹ Residential Walls							
	Wood-Framed one Wall Requirement	Premier SIPS					
Zone		4 ½"	Comply?	6 ½"	Comply?	8 ¹ /4"	Comply?
0 - 1	0.084	0.060	Yes	0.041	Yes	0.033	Yes
2	0.084	0.060	Yes	0.041	Yes	0.033	Yes
3	0.060	0.060	Yes	0.041	Yes	0.033	Yes
4	0.045	0.060	No	0.041	Yes	0.033	Yes
4 Marine	0.045	0.060	No	0.041	Yes	0.033	Yes
5	0.045	0.060	No	0.041	Yes	0.033	Yes
6	0.045	0.060	No	0.041	Yes	0.033	Yes
7	0.045	0.060	No	0.041	Yes	0.033	Yes
8	0.045	0.060	No	0.041	Yes	0.033	Yes

¹Premier SIPS U-Factors include inside air film, ½^{*} gypsum wallboard, Premier SI Values are calculated at 75 degrees.

ENERGY PERFORMANCE: Eliminate Attic Ceiling Interface & Venting

CHALLENGE #4

CHALLENGE #5

Vented Attic Problem: Settling, condensing & R-value loss over time (~50%). Must add air barrier between conditioned space

CHALLENGE #3

CHALLENGE #2

CHALLENGE #1

Premier SIPS: No venting required. No settling, or loss of thermal values. Air barrier is integrated.

ENERGY PERFORMANCE: Eliminate Attic Leaks



ENERGY PERFORMANCE: SIPS Superior – Air Leakage Commercial & Residential

CHALLENGE #1	CHALLENGE #2	CHALLENGE #3	CHALLENGE #4	CHALLENGE #5

- Current NEW code calls for max 3-5 air changes/hour at 50 pascals (ACH 50)
- SIPS Projects REGULARLY below 1 1.5 ACH50
- Premier SIPS achieve above & beyond national program requirements and code standards for ACH



ENERGY PERFORMANCE: Applying Energy Efficiency - LEED Certification

CHALLENGE #4

CHALLENGE #5

SIPS have a significant impact on environmental credentialing

SIPS are so efficient that they can qualify for:

• 40 LEED BD&C 4.0 points

CHALLENGE #1

• 47 LEED 4.0 residential points

CHALLENGE #3

CHALLENGE #2

Certify a residential project with SIPS alone!

FOUR LEVELS OF CERTIFICATION:

Certified: 40 to 49 points Silver: 50 to 59 points Gold: 60 to 79 points Platinum: 80 to 110 points



PROVIDE PERFORMANCE: Real Life Energy Performance & Renewable Energy

CHALLENGE #1 CHALLENGE #2 CHALLENGE #3 CHALLENGE #4 CHALLENGE #5

Cooper's Hawk – Multi-Family Community

- 18 units residential units each 1,152 sf
- SIPs building envelope pairs with solar on garage roofs for net-positive energy
- Solar energy generated operates each unit, 2 PHEV cars per unit <u>AND</u> the 54 existing surrounding homes
- US DOE Zero-Energy-Ready standard, including EPA Indoor Air Plus







DURABLE PERFORMANCE: Resilient & Ready for Natural Disasters



SIPs form a monolithic envelope with superior strength recognized by agencies in natural disaster-prone settings:

- FEMA Home Builder's Guide includes SIPs as a sound option for coastal construction
- Approved for Florida's strict High Velocity Hurricane Zones (HVHZ) - 180 mph winds
- Approval for seismic zones D, E & F for some manufacturers, not all



DURABLE PERFORMANCE: SIPs Standing Through Natural Disasters



Real life examples:

Hurricane IKE Home



ouisiana coast after hurri ane IKE, USA

Kobe Earthquake (6.9 Magnitude)



Tennessee Tornado



DURABLE PERFORMANCE: Termite & Fungal Decay Resistant



Fungal Decay & Termite Resistant (Not your average OSB/Insulation)

OSB Additives in production, such as Frame Guard[™] and Zinc Borate, offer warranties and can provide protection from:

- Weathering & fungal decay During job site storage & the construction process
- Termites & fungal decay After completion of the structure



EPS and GPS solid core insulations include termite resistant borate products in manufacturing to prevent termite infestation (safe for people & animals).

NEXT UP: Final Challenge #5



HEALTH DEMANDS: Challenge & Solution



CHALLENGE #5

Demand For Healthy Indoor Environments

Environments

HEALTH DEMANDS: The Importance of Indoor Air Quality (IAQ)

CHALLENGE #4

IAQ Facts:

CHALLENGE #2

CHALLENGE #1

- Americans, on average, spend 90% of time indoors
- Indoor pollutants 2-5 x higher concentration than outdoor
- Indoors often refuge from poor air quality (fires)

CHALLENGE #3



 Vulnerable groups (the very young and old), spend more time indoors, with more exposure to pollution's adverse effects.

CHALLENGE #5

 Or
 Indoor Jac Obal State

 Or
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HEALTH DEMANDS: SIP Solid Cores Eliminate Moisture Carrying Air Movement

CHALLENGE #4

CHALLENGE #5

The job of the building envelope is to prevent unwanted air infiltration.

Solid core insulation in SIPs create airtight environments:

- Eliminating air infiltration reduces moisture inside building cavities
- Without moisture, you can eliminate mold growth, fungal decay
- Minimize health risks for building occupants

CHALLENGE #2

CHALLENGE #1

Ensure air entering building is fresh & healthy, use mechanical ventilation systems to manage IAQ:

CHALLENGE #3

- Using Energy Recovery Ventilators (ERV) or Heat Recovery Ventilators (HRV) efficiently manages heat, moisture & humidity
- HEPA Filters manage contaminates such as dust, smoke & pollen





HEALTH DEMANDS: Clean Air Certified



Building envelope assemblies like SIPs can be tested for low VOC levels and certified by third party "Clean Air Certifiers."







HEALTH DEMANDS: Occupant Comfort = Temperature & Sound Control

CHALLENGE #4

CHALLENGE #5

SIPS also benefit Indoor IEQ by delivering:

CHALLENGE #3

CHALLENGE #2

CHALLENGE #1

- Temperature uniformity throughout the building
- Consistent comfort in every room/on every level
- Solid core walls dramatically improve sound control, reducing high-frequency irritating noises





We've Shown Key Challenges Are Tackled With SIPS

CHALLENGE #1	CHALLENGE #2	CHALLENGE #3	CHALLENGE #4	CHALLENGE #5
Maintain Construction Quality	Ongoing Labor Shortages	Increasing Material Costs	New Energy & Building Code Requirements	Demand For Healthy Indoor Environments
SOLUTION: Panelized Offsite Construction	SOLUTION: Easy To Construct With Less Labor	SOLUTION: Balanced Costs & Higher Value Structures	SOLUTION: Provide Performance	SOLUTION: Increase The Health Of Indoor Environments

RECAP: Beyond Tackling The Storm Of Industry Challenges....

COST SAVINGS

Time	 Framing Drywall Finishes & Trim Interest/Loan Costs
Material & Waste	 Structure: Lumber & Sheathing Insulation HVAC Air Sealing & Aire Barriers Attic Venting
Quality	 Save rework (Framing, Finishing) Call back reduction Inspections (Inherent QA) Training (MEP, Insulation, air sealing)
Tax Incentives	 Federal & Regional Private Utility

ADDED VALUE:

Enhanced Quality	 Accuracy & Precision Resilience & Strength (Fire, Wind, Seismic) 20 Year Structural Warranty Healthier, Comfortable Indoor Environments
Enhanced Space	 Thinner Walls = Added Space Conditioned Attic = Added Space/Storage Raised Ceilings = Added Volume
Reduced Operating Costs	 60% + Reduction in End User Operating Costs (Can afford a larger mortgage, upgraded commercial elements, etc.) Reduction in Owners Insurance
Sustainable	 Higher Appraisals Turn-Key Environmental Certifications

Summary: Three Real World Cost Saving Scenarios

#1 Addison Homes – South Carolina



Addison Homes
Greenville, SC
3BR / 3 Bath
~2,740 SF
\$450,000
Framed Walls/Roof
Non-SIP-Optimized:
No Ridge Beam Column Location with Open Space
SIP Roof Requires Truss Framing
No 2 Ft. Dimensions **SIPS vs Site Framing Costs**

BID PACKAGE COMPARISON SIPS + 59% \$\$\$

"TRUE COST" COMPARISON (Add labor, time, HVAC, trades, carrying cost savings, tax credits, increased profits) SIPS + 10% \$

SIPS OPTIMIZED & "TRUE COST" COMPARISON - 4% \$

Summary: Three Real World Cost Saving Scenarios

#2 Duke Street Cottages – North Carolina



Duke St. Cottages Granite Falls, NC • 2BR / 1 Bath • ~1,600 SF • \$199,900 • SIPs Walls/Roof SIP-Optimized: • Simple Roof • ½ Attic Storage • ½ Sloped Ceilings • 2 Ft. Dimensions • Ductless Minisplit

High-Efficiency HP

SIPS vs Site Framing Costs

BID PACKAGE COMPARISON SIPS + 56% \$\$\$

SIPS OPTIMIZED "TRUE COST" COMPARISON (Add labor, time, HVAC, trades, carrying cost savings, tax credits, increased profits) SIPS - 65% \$\$\$

Summary: Three Real World Cost Saving Scenarios

#3 Prairie Lofts – Minnesota



Prairie Lofts Leverne, MN • Built 2022 • 2 Bldgs./54 Units • 1BR/2BR Plans • HERS 45 w/o Solar • 1.35 ACH50 • SIPs Walls: - Exterior - Hall - Demising SIP-Optimized:

- 1 Hour from Plant
- Simple Design

SIPS vs Site Framing Costs

BID PACKAGE COMPARISON SIPS + 11% \$\$

"TRUE COST" COMPARISON (Add labor, time, HVAC, trades, carrying cost savings, tax credits, increased profits) SIPS - 31% \$\$\$

The SIPs Process: Plans to Production to Install

P. FOUIPMEN

PREMIER

Your local SIPs Rep can help with tips on optimizing designs for SIPs construction or help convert existing plans to SIPs



No Need To Wait - Innovation Is Here With SIPS



