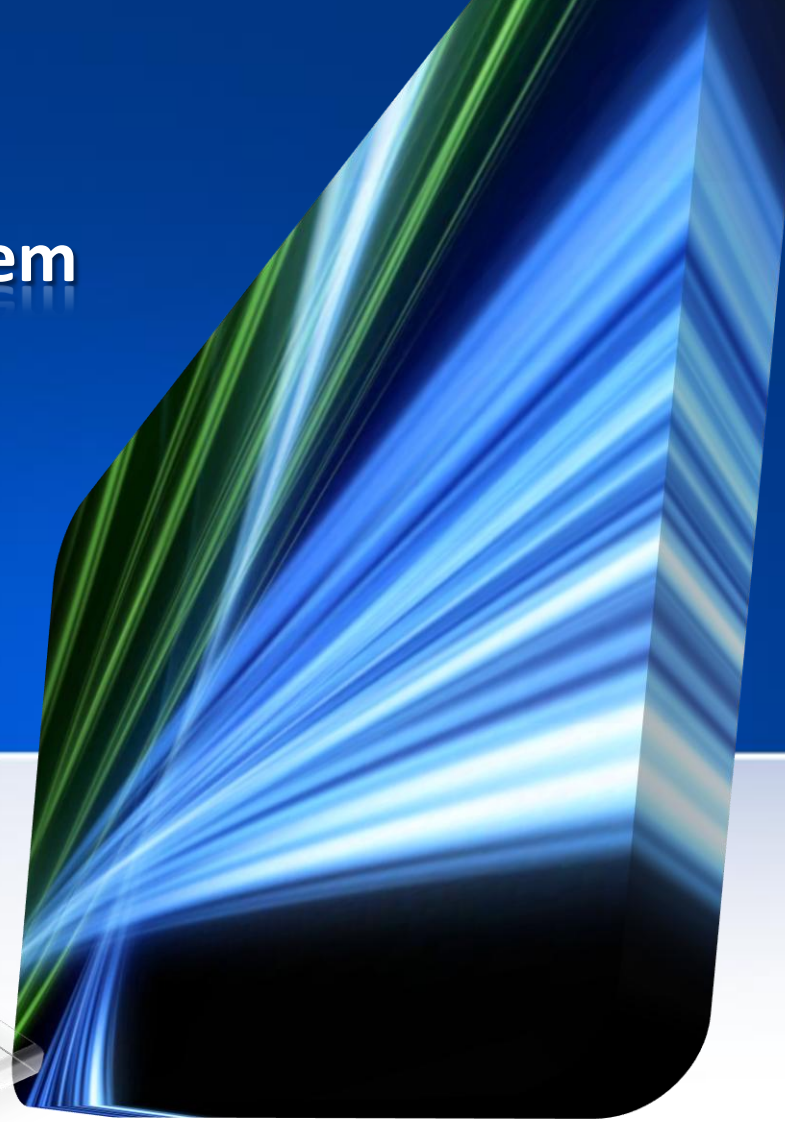


# SIPs

## Structural Insulated Panels System

The building technology  
of the future



# What are SIPs?



- **Structural Insulated Panels (SIPs)** are prefabricated insulated structural elements for use in building walls, ceilings, floors and roofs.
- **Structural Insulated Panels** are manufactured under factory controlled conditions and are custom designed for any type of building, being delivered to the construction site ready to install
- Structural Insulated Panels construction systems are rapidly revolutionizing the construction industry. The panels are faster to erect, result in straighter, flatter walls, have excellent insulating properties, and are significantly stronger than any other conventional constructions



- **SIPs – A completely new idea of building securely, along with low construction cost, sharp reduced maintenance and running costs and no restrictions in architectural design**
- **SIPs – The building technology of the future**

# SIPs Anatomy



**SIPs are made of a layer of PIR rigid thermal-insulating foam, plated on both sides with OSB 3.**

- **PIR Foam**

- Thermal conductivity coefficient  $\lambda=0,021$  W/m<sup>2</sup>K
- Thickness: 90 mm, 120 mm, 150 mm, 180 mm, 210 mm
- Density: 46 kg/m<sup>3</sup>
- Non flammable and non combustible
- Superior structural reaction

- **OSB Boards**

- The OSB3 boards have the technical characteristics according to the European Standards
- Thermal conductivity coefficient  $\lambda=0,17$  W/m<sup>2</sup>K
- Made using biodegradable products, protected against insects, rats, fire, humidity
- Thickness: 12 mm, 15 mm

- **Dimensions\*:**

- Standard length: 2500 mm or 2800 mm;
- Standard width: 1250 mm
- Thickness: 120 mm, 150 mm, 180 mm, 210 mm, 240 mm

**\* OTHER DIMENSIONS CAN BE PROVIDED**



# SIP System



## WHAT DOES **SIP** MEAN?

- A new philosophy in construction
- A complete build up solution (Integrated Building System) internationally recommended
- Last generation technology and product
- Meets all criteria for sustainability, green buildings, energy efficiency, energy consumption
- Build more in less time



# SIPs – An INTEGRATED system



Together with the SIP panels, the SIP System provides other special elements :

- **SIP Connectors**
  - L-type connectors – wood connectors used for the openings & panels connections
  - S-type connectors – SIP connectors (used in between 2 SIP panels – only vertical connections)
- **Bottom plate & top plate**
- **Beams** - Solid beams, I-beams, Posi Joists, Glulam, other
- **Roof elements** – perlins, ridge beams & rafters, truss, girders
- **Hangers**
- **Up-lift elements & tie-down system**
- **Shear elements**
- **Anchor bolts**
- **Nails, screws, screw-nails, ring-shank nails** etc.
- Hydro insulation membrane & Vapor barrier membrane
- MGO Board (Magnesium Oxide Board)



*For more details please refer to the **Technical Manual***

# SIP Uses



## WHERE TO USE SIPs?

- The SIPs technology has been tried and trusted worldwide for over 50 years, and it is internationally recommended
- SIPs are used in the construction of:
  - Individual houses – from social houses / low budget to luxury villas
  - Vacation houses and resorts
  - Residential projects (houses or apartments)
  - Institutional buildings – schools, hospitals, churches, shelters for orphans or old people, etc
  - Commercial spaces



## WHO CAN USE SIPs?

- Homeowners , Developers, Contractors, Builders, Architects, Designers, Engineers

# SIPs Features & Advantages



## Energy Efficiency

- A SIPs building can achieve outstanding thermal efficiency through air tightness, insulation and homogeneous material layers
- The excellent thermal qualities of SIPs make it relevant and beneficial solution both for colder climates as well as for hot climates
- Building with SIPs creates a superior building envelope with high thermal resistance and minimal air infiltration
- A continuous insulation and vapor envelope reduces energy use significantly, and the property owner will see savings on their monthly energy bill



# SIPs Features & Advantages



**SIPs are GREEN & SUSTAINABLE – Save resources**

The major components of SIPs (PIR foam and OSB), take less energy and raw materials to produce than other structural building systems; i.e. 95% of a tree can be used when it is cut into wood chips to make OSB for SIP facings, vs. 63% of a tree when it's sawn into solid lumber; the panel's foam core is recyclable

**None of the components contribute to environment degradation!**

SIPs come from one source only, as an INTEGRATED system, therefore less impact on the environment:

- less air & water pollution, gas emission, CO2 emission on the construction stage as well as on the running period of the building (due to the excellent energy efficiency and air tightness)
- less transportation and less waste materials
- precise control over the indoor air quality of the home, keeping out allergens, humidity or dust
- no “heavy” industry production for iron, cement, aggregates, bricks etc. needed

SIPs are the most compatible with other systems that lead to passive homes

On a life-cycle basis, a more energy-efficient house built with SIPs will be less damaging to the environment, in terms of overall resource consumption.



# SIPs Features & Advantages



Safety & Strength



- SIPs are significantly superior to the conventional constructions; there is considerable evidence that homes built with SIPs have survived natural disasters like hurricanes (*Katrina*), tornadoes, straight-line winds and earthquakes (*Kobe*) better than traditional homes
- The proven superiority in transverse and axial loading capabilities and increased racking resistance over conventional framing make SIPs a stronger, safer alternative; SIPs have exceptional strength to resist typical loads caused by seismic activity and high winds
- Strong framing product allows for longer spans, often without a truss system
- Fully designed and fabricated in a controlled factory environment, SIPs ensure the end product that arrives on site is accurate and defect free
- SIP constructions are certified for 60 years lifespan, while the concrete buildings have a scientific lifespan of 50 years

# SIPs Features & Advantages



## Design Flexibility

- SIPs are completely flexible and tailored to suit any requirements; complicated shapes and angles can be produced more economically often without the need for additional costly frames, while saving the usable area
- When a project is designed with SIPs components from its conception, the modular size and spanning capabilities of SIPs can be fully utilised
- Individual architects schemes can be modified to work with SIPs, usually without affecting the look of the project
- Any changes can be easily made to existing projects: extra rooms or floors, attics etc.
- Design flexibility and production capabilities inherent with the SIPs system make it attractive for both **custom projects** and to those interested in **affordable housing**



# SIPs Features & Advantages



## Affordability & Cost Efficiency

- SIP basic construction cost is 30% less than conventional concrete buildings
- Pre-insulated – no need to purchase additional insulation; pre-fabricated & pre-cut when delivered to the jobsite – save 20-30% on framing labour;
- Exact construction planned costs and precise quantity of materials needed, as on site cutting and fabrication are eliminated. This means you will not have unexpected costs or surprises from your contractor
- Low cost modifications and fast rate of construction, which will minimise the time, cost and labour force on your project
- Major running and maintenance cost savings over the lifetime of the building, therefore extremely low costs on energy, repairs or design changes
- Building with SIPs offers cost advantages to the builder in terms of speed of construction and reduced labour requirements



# SIPs Features & Advantages



## Time Savings - Build more in less time



- From a material standpoint, SIPs take the place of a whole assembly. Instead of separate pieces of framing, insulation and sheathing, a SIP panel incorporates ALL of these components and comes ready to install – this reduces the erection time drastically
- Walls and roof are straight from the start with precisely cut panels, and a range of finishes can be easily applied, turning each building or home into an unique structure
- Less labour means fewer trades people on site, saving time and costs, and also earlier site lock-up with reduced exposure to theft, vandalism and the elements
- Speed of completion means earlier cash recovery and improved cash flow

# A Brief History About SIPs



- Development of a structural insulated panel began in 1935 at the Forest Products Laboratory (FPL) in Wisconsin. FPL engineers speculated that plywood and hardboard sheathing could take a portion of the structural load in wall applications. Their prototype SIPs were constructed using framing members within the panel combined with structural sheathing and insulation. The panels were used to construct test homes that were continually monitored for over thirty years, then disassembled and reexamined. During this time, they continued to experiment with new designs and materials.
- Famed architect Frank Lloyd Wright used SIPs in some of his affordable Usonian houses built throughout the 1930's and 1940's. SIPs took a major leap in technology when one of Wright's students, Alden B. Dow, son of the founder of Dow Chemical Company, created the first foam core SIP in 1952.
- By the 1960's rigid foam insulating products became readily available resulting in the production of SIPs as we know them today. The **Structural Insulated Panel Association** was founded in 1990 to provide support and visibility for those manufacturing and building with this emerging building technology.
- In the 1990's SIPs saw the development of advanced computer aided manufacturing (CAM) technology. Computerized architectural (CAD) drawings can be converted to the necessary code to allow automated cutting machines to fabricate SIPs to the specific design of a building.
- Today SIPs offer a high tech solution for residential and low rise nonresidential buildings.

# Why SIPs – Other reasons



- The world face enormous challenges in supplying a growing population and growing economy with energy and doing so in a way that avoids the hazards of climate change
- Residential buildings are 20% of the energy and climate problem
- Buildings are responsible for 1/3 of all energy related greenhouse gas emissions (~68% of electricity)
- New building technologies, and SIPs in particular, present some of the most powerful and cost-effective solutions
- Climate change will influence building energy use – more cooling, less heating
- Stabilizing climate will require ~3x reduction in energy use per square meter
- Perfect solution for PASSIVE HOMES
- Perfect solution for MODULAR HOMES



# SIPs – References



- EU norms, ETA norms: ETAG 019, ETAG 016
- More specialized organizations: EUROCODE 5 for Structural Properties
- All these regulations are on place
- All the materials and elements used are certified
- The software programs for engineers and architects are easy to use



**SIP System is used EVERYWHERE in the world  
With SIPs, you can build ANYWHERE, ANYTHING, ANYTIME**

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