

# BioSIPs: A deeper shade of green?

Jacqueline McIntosh  
Mark Harrington

**Victoria**

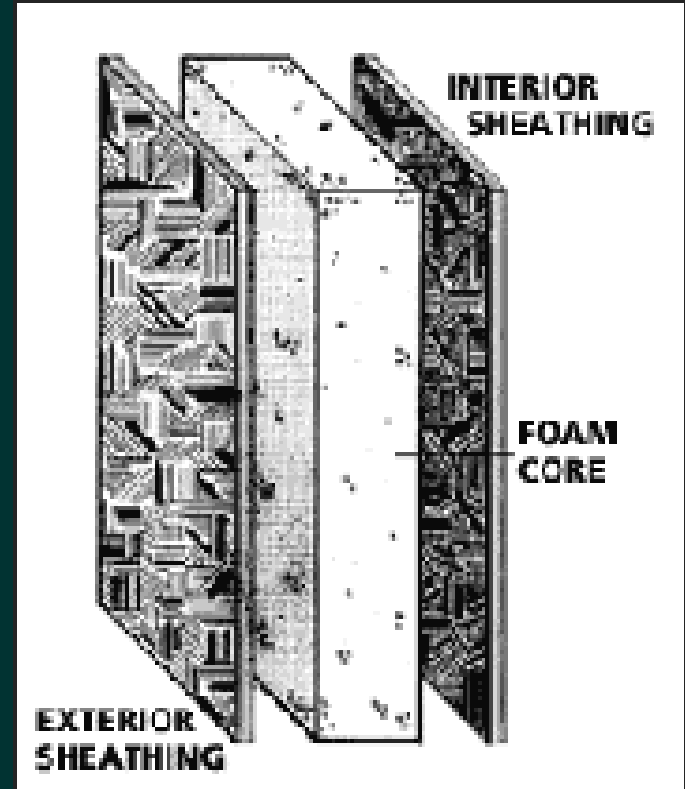
UNIVERSITY OF WELLINGTON

*Te Whare Wānanga  
o te Ūpoko o te Ika a Māui*



# Structural Insulated Panels

- Engineered wood facing panels
- Polyurethane, or Polystyrene core
- Functions structurally similar to an I-beam
- Load bearing



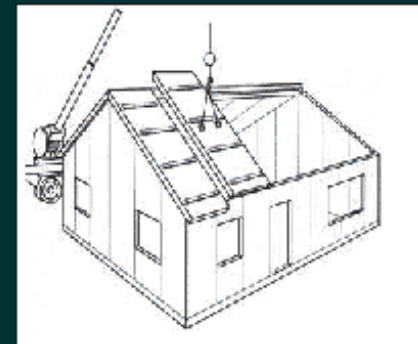
# Construction

Lightweight

Modular sizes for transportation

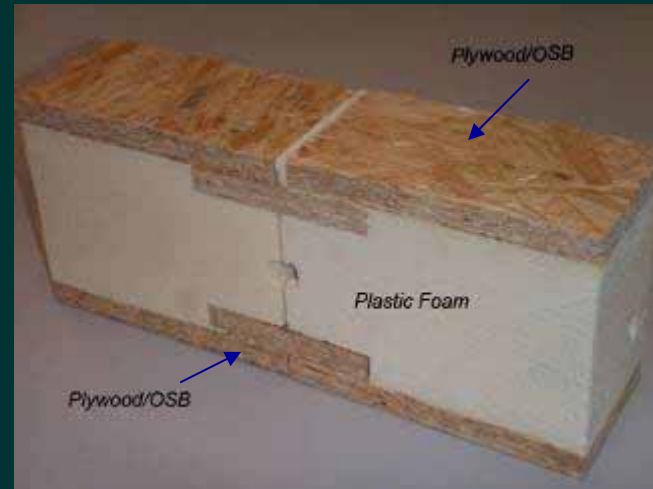
Conventional construction tools and skills

Precut at the factory for onsite assembly, SIPs centralise the design/manufacturing process, reducing the requirement for on site skilled labour

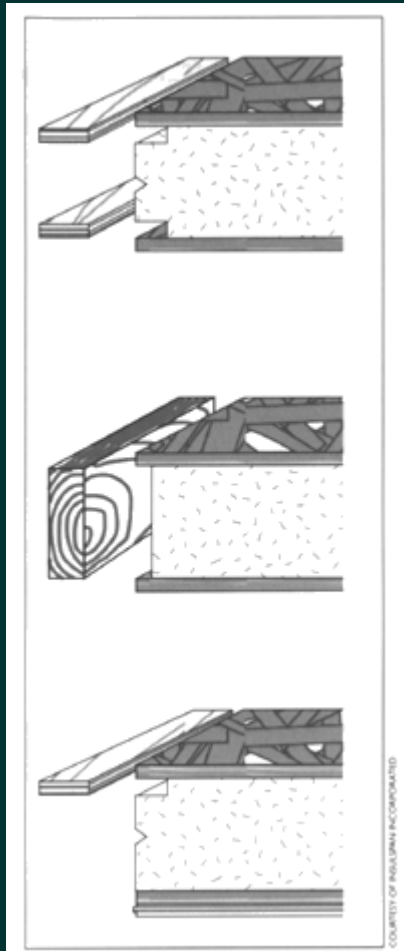


# Construction

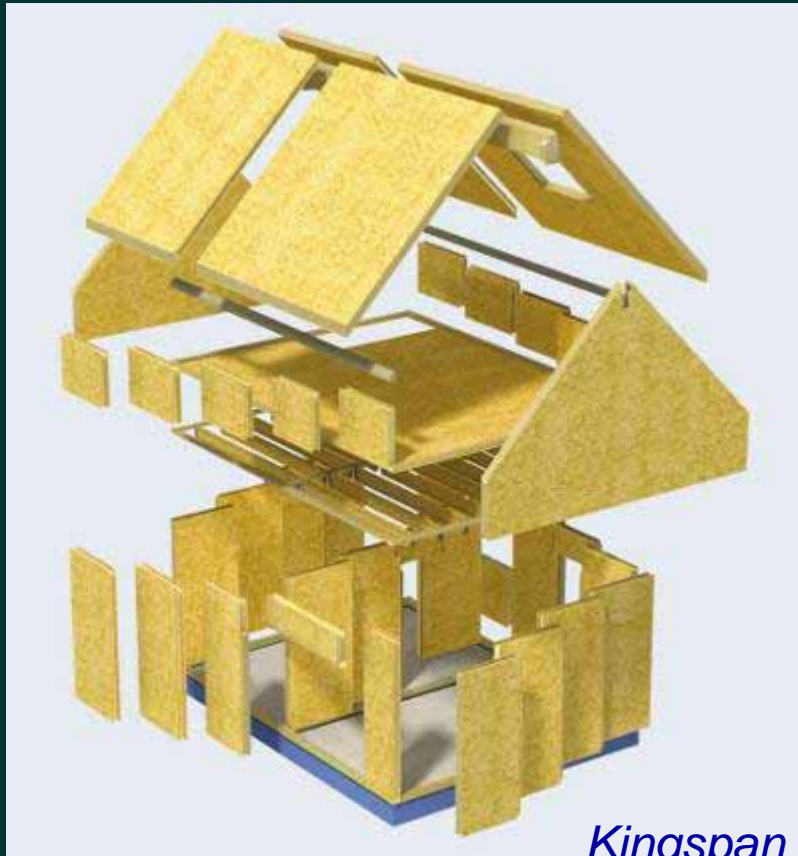
The panels are slotted together to form the **structure** of the building – without framing



# Construction



# Structurally Insulated Panel Systems (SIPs)



Can be used as:

- Walls
- Floors
- Roofs
- Interior walls
- Additions to other construction systems

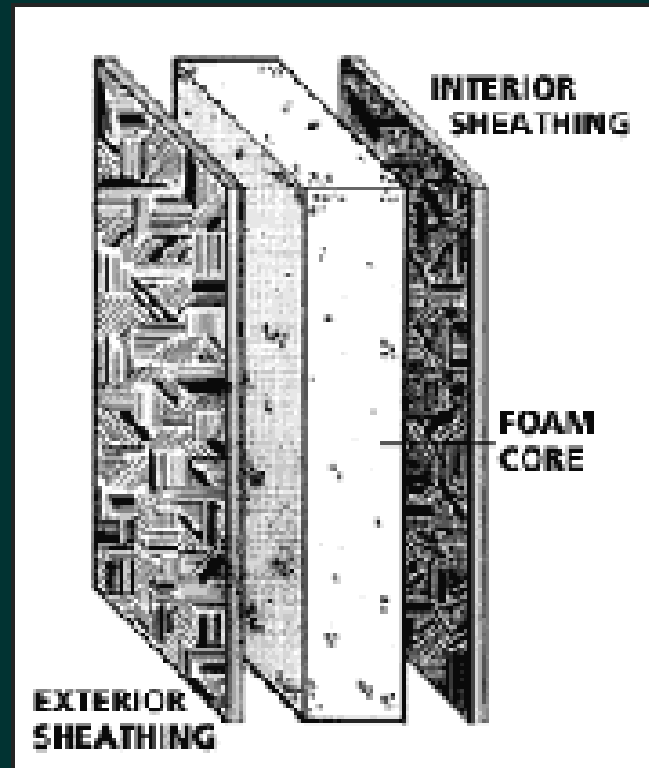


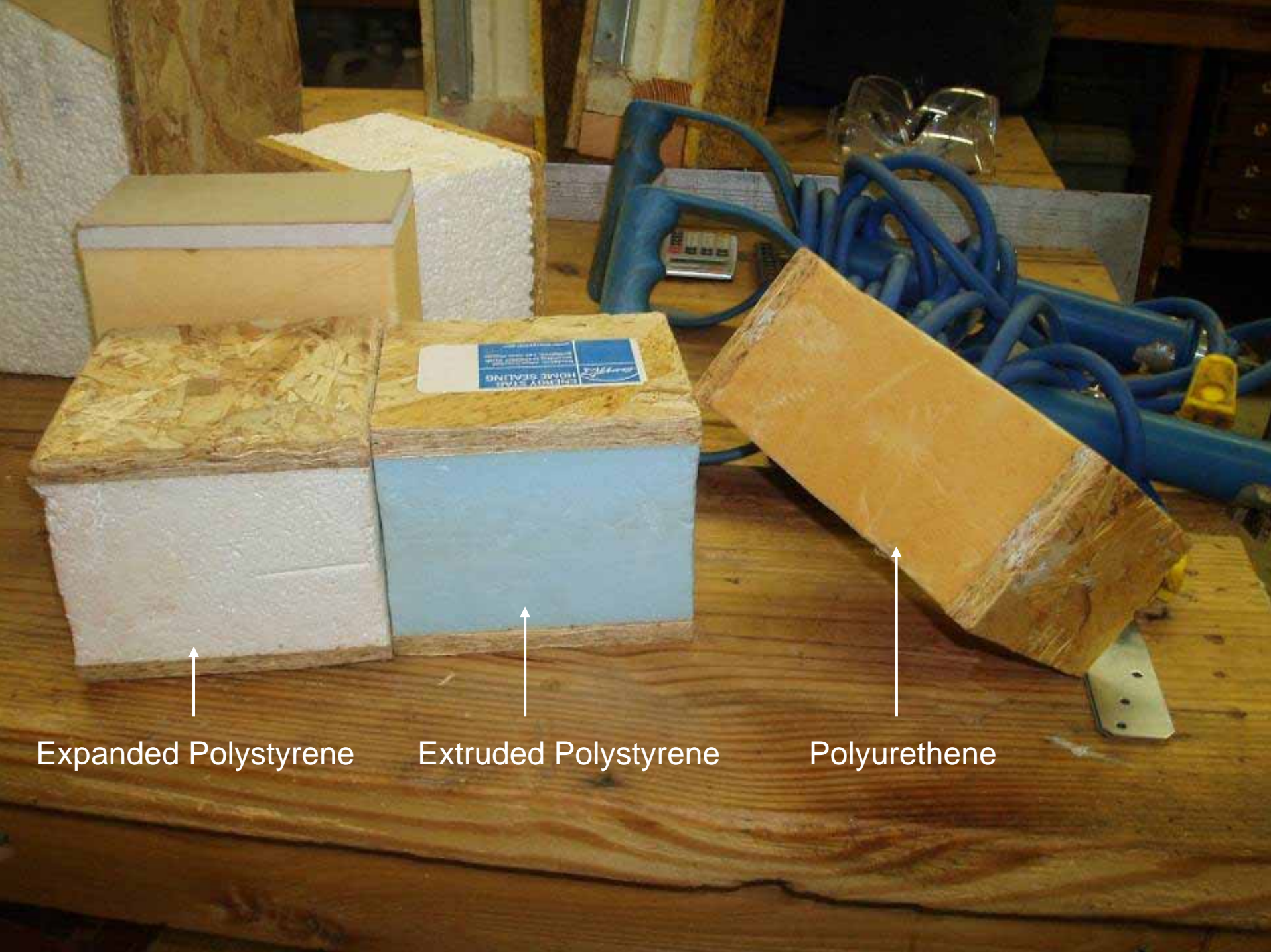
# Superior sustainability performance



**Energy efficient**  
**Renewable**  
**Waste efficient**  
**Healthy**

# Components of a SIP





Expanded Polystyrene

Extruded Polystyrene

Polyurethane

# Polyurethane Foam



# Some previous conclusions

**SIPs are more sustainable than traditional construction methods**

**The advantages of SIPs are relevant to the New Zealand situation**

**SIPs are not currently the sustainable solution to New Zealand housing**

**To be sustainable, New Zealand must develop its own SIPs, responding to local conditions, markets and resources**



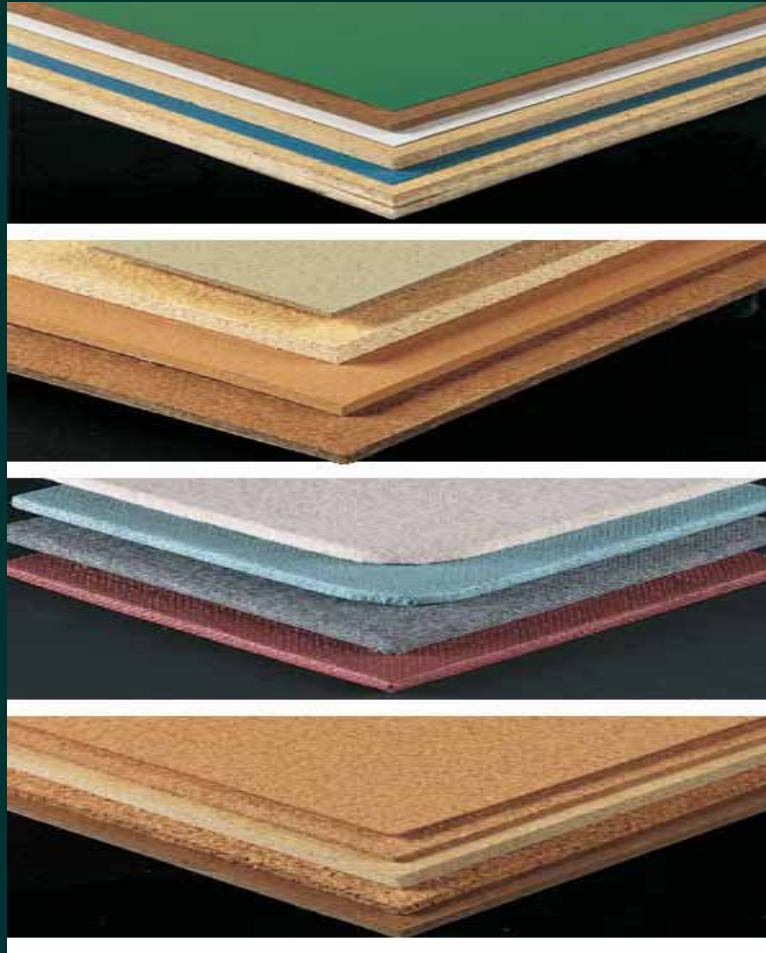
# Facing Panels



# Facing Panels: Honeycomb Panel



# Other



Natural Fibre Board



# Insulating Core



Colorado University BioSIP

# Oil based foams: Soy



# NZ Developed Biofoam

- CO<sub>2</sub> foamed biopolymer
- Base polymer polylactic acid (PLA)
- PLA commercially available
- Density and insulation similar to polystyrene
- Invented and developed by the Biopolymer Network
- Lead scientist Michael Witt (Scion)



# Agriboard



# Some Conclusions

- BioSIPs are the future
- Rate of research and commercialisation of New Zealand building products will slow the uptake
- There are SIPs manufacturing issues related to the different types of foams that will influence a NZ SIPs industry
- Make, buy or both



# School of Architecture

[jacquie.mcintosh@vuw.ac.nz](mailto:jacquie.mcintosh@vuw.ac.nz)

[mark@hma.net.nz](mailto:mark@hma.net.nz)

## Victoria

UNIVERSITY OF WELLINGTON

*Te Whare Wānanga  
o te Ūpoko o te Ika a Māui*

