WHAT IS A WPC?

- ModWood® is a Wood Polymer Composite (WPC)
- ModWood boards contain:
  - >50% reclaimed AFS *Pinus radiata* shavings from mills
  - < 35% is recycled High Density Polyethylene (HDPE) - milk bottles
- ModWood® is Australian
  - Made and Owned.
  - Established in 2001
  - Purchased by AV in 2004
  - Now part of Wesfarmers Group
- ModWood® offers a range of WPC boards for screening and decks in residential and commercial applications
WHERE HAVE WPCs COME FROM?

1st Generation WPCs developed in USA and Europe in late 1980s

Main objective was to find a beneficial outlet for used plastic packaging, mainly PE film and bottles

Wood flour has been used as a filler / reinforcer for plastics since the 1930s (eg Bakelite radio cabinets and electrical switches)

Yield from trees to dressed lumber maybe 60% - so plenty of wood waste available

Maths \((-) \times (-) \Rightarrow (+)\) !!!!!!!!!!!!!!!!!!!!!!!

1ST GENERATION WPCs

Simple formulation about 50% wood flour, 50% polymer plus cheap pigments, melt-mixed and extruded into boards and profiles

Modest mechanical properties of strength and stiffness

Profile thickness increased to give acceptable load capacity and deflection

High moisture absorption giving in-service issues: Swelling, mould, cracking \(ightarrow\) litigation in USA

In-service reality significantly short of promotional hype
2ND GENERATION WPCS

- More complex formulations incorporating ‘coupling agents’ to improve wood-polymer adhesion, improved stabilising and pigment systems for better colour retention
- Improved mechanical properties and reduced moisture absorption
- Longer, much more satisfactory service outdoors

3RD GENERATION WPCS

- Further formulation and appearance improvements with surface decoration including ‘grain’ lines and embossing
- Provision for ‘hidden fasteners’
- Good mechanical properties
- Robust against accelerated weathering and long-term outdoor weathering tests
- ModWood products have obtained excellent passes against US Standards for WPCs
- Current ModWood offer is ‘3rd Generation’
Serious issue in Australia with wildfires, with recent heavy loss of life and property

Development of ‘Bushfire Attack Level’ concepts and standards for buildings in fire-prone areas – affects about 6% of Australian residential properties

R&D program to see if ModWood could make a satisfactory offer to the BAL-29 level (29 kW/m² attack level)

Achieved BAL-40 level (40 kW/m² attack level) pass on large-scale fire tests to Australian Standard

“Flame Shield®” products added to the range, giving Australian customers some choice for decking in bushfire-prone areas.
WPCS – WHERE TO FROM HERE?

- Wide choice in reinforcing fibres / fillers
  - Softwood / hardwood
  - Rice hulls / bamboo
  - Straw / hemp
  - Minerals such as talc, wollastonite, nepheline syenite

- Wide choice in base polymers
  - HDPE / LLDPE
  - PP
  - PVC

- The available Australian supply of softwood fibre + HDPE will meet ModWood requirements for some time to come

PLASTIC LUMBER

- A wide range of hollow profile wood-finish PVC profiles now offered in USA, Europe and Asia for ‘timber lining’ indoor and outdoor rooms, supplementing established PVC profiles in windows and doors

- Heavier hollow profiles offered for decking but stiffness is poor and moisture traps can generate issues with WPC profiles

- Foam-core and hollow PVC extrusions have achieved some limited application for deck boards in USA and Europe

- Early problems with ‘chalking’ and colour fade appear to have been largely overcome
4TH GENERATION WPCS

Coextrusion technology allows a thin ‘capstock’ to be applied over a WPC core

Benefits are:
- Expensive additives can be concentrated in capstock for maximum decorative potential, long-term colour retention, scratch-resistance
- WPC core formulation can be economised
- Improved water resistance from impervious capstock

Some producers wrap the whole board, some choose to coat only the upper surfaces

Short-term service history is good – long-term?

CAPSTOCK

Complex choices in base polymer for cap
- HDPE
- Ionomer
- ASA

Formulation additive choice in capstock and core
Decoration choice
Product design alternatives
Surface finish and slip properties
Value / cost optimisation
Stiffness performance
**FASTENERS AND ACCESSORIES**

- Wide range of fasteners now available with hidden fasteners increasingly used instead of screws and nails.

- Larger producers offer a wide range of accessories such as rails, balustrades, stair treads, deck lighting and deck furniture.

**AUSTRALASIAN MARKET**

- Many new entrants pushing a wide range of 2nd, 3rd and now 4th generation WPC sections as well as plastic lumber manufactured in USA or Asia.

- Some of the products have quite poor mechanical properties and are unlikely to be satisfactory at Australian standard joist spacing of 450 mm, particularly in warmer locations.

- Risk that lower-grade products damage the reputation of all WPCs.

- Questions?
MODWOOD FINISHES

- Low maintenance.
- High durability.
- Environmentally friendly.
- Stiffer and stronger than other composites.
- Textural and Visual "Natural Grain" variation in the board.
- Proven performer in the harsh Australian environment.
- Custom length.
- Slip Rated  137mm including Flame Shield® = R11    (88mm = R10)
- Shore D Hardness 95
- Specific Gravity 1.15
- CSIRO Rates as a "Termite Control Product"

MODWOOD COLOUR RANGE

- All 137 x 23mm are R11 Deep Embossed
HEAVY DUTY - MARINA

- ModWood Marina board is a bigger, stronger board
- It is designed for seating, garden edging; and heavy duty decking areas like Boardwalks and marinas
- It won’t rot, making it the ideal choice for any outside environment
- All ModWood Boards are not affected by salt air, or the harsh elements

DECKING

- Hard wearing and easy on the feet.
- Tests have shown ModWood to have a similar surface temperature to timber.
- ModWood is child friendly as it does not splinter.
- This makes it ideal decking for use around pools, or Spa areas.

* Refer to ModWood - Fixing over Concrete
SCREENING

- The modern lines of ModWood Mini board allows a private oasis to be created anywhere outdoors
- Private courtyards, cosy outdoor living areas; and
- Stunning garden features can be created with this sleek designer product
- Adding contemporary design style to your homes

MODWOOD FIXING - KLEVAKLIP

- ModWood can be fixed using conventional fasteners
  - predrill and screw or nail
- For concealed fixing KlevaKlip is the preferred method.
- Using KlevaKlip will reduce installation time.