INFORMATION SHEET
STRUCTURAL MATERIALS

NZ WOOD
For a better world

PANEL PRODUCTS
MANUFACTURE

The information provided below has been taken from the New Zealand Timber Design Guide 2007, published by the Timber Industry Federation and edited by Professor A H Buchanan. To purchase a copy of the Timber Design Guide, visit www.nztif.co.nz

PARTICLE TYPE BOARDS

These boards contain particles of wood that may be chips, sawdust, shavings, flakes, wafers (larger), or strands (split wafers) of various size, geometry or species. Some boards have oriented particles or flakes (strands) to improve properties in one direction, and these are referred to as oriented strand board (OSB).

Logs or sawmill residues are chipped or processed into wood particles of the desired size and geometry. These are then dried, may be screened for size and quality, are mixed with adhesive and wax water repellent, formed on a mat, and pressed at the required temperature and pressure to cure the adhesive. Most particle boards use urea formaldehyde resin, which limits use to reasonably dry environments.

The type of board being manufactured dictates the ideal wood particle size. For structural boards such as OSB, particles should be as long as possible to maximise the amount of overlap between particles and, therefore, strength. Length and thickness are the most important dimensions to control. OSB typically uses particles 75 mm long, but can be up to 150 mm. In conventional particleboards, particles between 10 and 38 mm in length are used. Particle thickness of between 0.2 and 0.5 mm is desirable but the longer the particle, the greater the thickness can be without compromising board strength. Board thickness and ease of handling long particles are the only constraints.

Flooring boards must have short term moisture resistance during construction, and are higher in density than standard particle board. For wet areas such as bathrooms or kitchens, boards with melamine urea glue should be used, usually identifiable by green dyed flakes in the core of the board. There have been attempts in New Zealand to use more durable adhesives in particle boards but they are not currently available because of costs, problems in processing and in service.

MEDIUM DENSITY FIBREBOARD (MDF)

Medium density fibreboard or MDF is made from green wood chips, mainly radiata pine, which are steamed, refined, reduced to fibres, dried and blended, usually with urea formaldehyde resins and waxes. The prepared fibres are then air felted to form a thick mat of fibre which is compressed under controlled temperature and pressure to form boards between 3 mm and 25 mm thick with a fine homogeneous structure through the thickness. The panels are sanded and sawn to finished sizes.

TRIBOARD

Triboard is made in one pressing from mats of fibre and strand. The layers are not separated by a distinct glueline.

Triboard is unique and consists of an inner core of wood strands sandwiched between surface layers of MDF (Medium Density Fibre). Typically the MDF fibre surface layers are 2mm to 3mm thick. For example a 24mm thick Triboard panel would have a 20mm strand core with two 2mm thick surfaces of fibre. Triboard can be manufactured with the MDF fibre surfaces up to 10mm in thickness.

Triboard can be tailored to customer's requirements. The strand core and fibre surfaces can each be configured according to thickness, density, resin type and resin loading to meet specific end use requirements. Triboard is pressed in one integrated pressing process and can be made in a variety of thickness' ranging from 10mm up to 100mm.

HARDBOARD AND SOFTBOARD

Chips, sawdust and shavings are refined to form a fibre slurry or pulp, additives for either softboard or hardboard are added, and the slurry is formed into a mat, pressed in a rolling felt and passed through a drier for 1.5 hours for softboard or four hours for hardboard. After trimming to sheet sizes the softboard is ready for dispatch whereas for the hardboard, sheets are preheated and pressed at high temperature and high pressure to form medium density (or standard) hard-board which may then be conditioned and or tempered with spray or dip tank as required.

Flameguard is a low density softboard insulating product with fire retardant. Triple S is softboard with bitumen emulsion for sub sheathing, replacing less rigid roofing papers or building papers under plaster or brick veneer.

LAMINATED STRAND LUMBER (LSL)

The 1980's saw the development of technology that allowed the production of a relatively strong structural member from low grade logs that would not normally be used for conventional wood products because they were not large, strong or straight enough.

In this process, the debarked logs are used to provide the material for flaked strands, which can be up to 300mm long. These strands are then dried, coated with resin, and pressed into large billets by a process which includes steam injection.

The billet may be up to 140mm thick, 2.4mm wide and 10 metres long. After sanding, a large number of sizes are cut to suit applications such as headers, rim-joists for floor systems, columns, joists and studs.

Source: Williams, G. *Engineered Wood Products – Experience and Opportunities*. Timber Design Journal.

PARALLEL STRAND LUMBER (PSL)

This product was invented in Canada and following 20 years in development, made its way onto the market in the late 1980's.

Large members, some approaching sizes common in glulam are manufactured by assembling small (3mm x 15 mm) strands which have been chopped from sheets of veneer up to 2.4m long.

The strands are generally taken from veneers peeled from the outermost section of the logs, where stronger grain is located.

Veneers are dried to 11% moisture content and graded for strength before chopping into strands. They are then aligned parallel to one another, coated with a waterproof adhesive, then pressed and cured using a microwave process to form a rectangular billet up to 275mm wide, 305mm deep, and 20 metres long.

The product is quite uniform throughout the cross section, and is re-sawn from the manufactured billet to quite an array of sizes.

The varied profiles accommodate several applications. These include 45mm wide piles to serve as built-up headers in much the same way as does LVL. Wider widths (65mm, 133mm and 178mm) are well suited to longer span beams and headers.

Again, the even distribution of necessarily small defects in the individual strands allows for a considerably higher strength than is available from normally available solid timbers of the same cross section.

Source: Williams, G. *Engineered Wood Products – Experience and Opportunities*. Timber Design Journal.

ORIENTED STRAND BOARD (OSB)

In the manufacture of OSB, wood strands of about 75mm in length are bonded with adhesives to form a mat.

Source: Williams, G. *Engineered Wood Products – Experience and Opportunities*. Timber Design Journal.

CEMENT FIBREBOARD

Cement bonded particleboard is available in a number of overseas markets. In New Zealand the most well known cement fibreboard is made by the Hardies group. Products such as Hardiplank or Hardiflex contain wood and cement in reverse proportions compared with the boards described above. It is effectively a wood fibre reinforced cement sheet, rather than a bound wood fibre sheet.