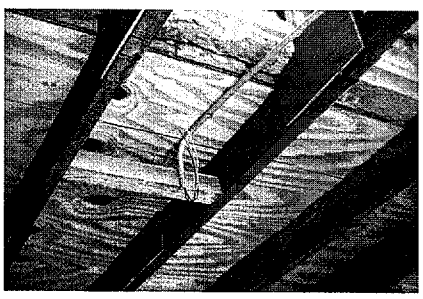
5 Construction methods



APA

5.1 Coverings

The following pitched roof coverings are suitable for use in conjunction with plywood sarking: tiles, both concrete and clay; slate and stone; and fully supported built-up bitumen felt and felt strip slates.

For all types of roof covering, underlay must be fixed to the plywood using felt nails or hot-dip galvanised steel nails of 3 mm diameter, thus providing a weather shield. The effectiveness of the underlay will depend on the pitch of the roof, overlap lengths between sheets and at roof hips and valleys, and sufficient mechanical fixing to the plywood sarking. To afford adequate protection to the plywood and avoid condensation forming, the underlay should have adequate strength and a vapour permeability of not less than 0.36 g/m^2 per 24 h at 25 °C and a relative humidity of 75%, tested in accordance with BS 3177. If insulated underlay is used to place the dew point outside the plywood sarking then the insulating material should be durable and damp resistant and should not cause obstruction in the batten and tile space.

Roofs with tiles or slates require counter battening before tiles may be fixed. This ensures that there is an unobstructed vertical path for water to run off which penetrates past the top roof covering such as tiles. In this case the underlay may be either fully supported by the plywood sarking or unsupported between the battens and counter battens. Additional air flow behind unsupported underlay will help to increase the overall permeability of the roof construction and reduce the likelihood of condensation forming.

All tile, slate and felt roof coverings should be lapped, both in the horizontal and vertical direction, according to the recommendations in BS 5534-1. Mechanical fixing of the roof covering should be to the battens and not directly to the plywood sarking. Special attention should be paid to the construction of valleys, which are a particularly vulnerable part of the roof as its pitch is several degrees less than that of the general roof surface. Construction of this problematic detail is made easier by the presence of plywood sarking, which may provide full support for formed sheet metal channels.

If a bitumen felt roof covering is specified, sheets should be bonded to the roof and built up as two to three layers in accordance with BS 8217.

Flat roof coverings rely more heavily on workmanship and material quality than their counterpart pitched roof coverings since gravity works against the roofing system rather than being utilised. Great care must be taken to ensure that bonded sheets provide a waterproof seal and unbonded sheets allow for movement of the underlying material at discontinuities. Because of the greater use of adhesives and to avoid water being trapped in the constructed roof, sheet membranes should not be handled, laid or jointed when any rain, sleet or snow is falling.

5.2 Layout and fixing

British Standard BS 8103-3 Annex L covers the fixing of plywood for use as a flat roof decking. Specifications for contractors should include the following:

- Plywood should be laid such that the face grain lies perpendicular to the supports.
- Fixing nails should be located at centres not exceeding 150 mm along edges and 300 mm along intermediate supports.
- Expansion gaps of 3 mm should be provided at board edges and noggings or counter battens inserted beneath any unsupported edge (unless tongued-and-grooved boarding is used)
- Either plain wire nails or annular-ringed shank nails may be used to the specification in BS 8103-3 Annex L. The relevant clauses of BS 1202 must also be met.

Plywood should ideally be installed with moisture contents within the range that will be experienced in service, especially for warm deck construction where ventilation is not provided to dissipate excess water. The moisture content at time of erection or fixing of plywood decking or sarking should not be more than 18%. The final moisture content will vary according to the type of roof construction and prevailing conditions. Generally, for sarking and flat roof cold decking, the moisture content will not exceed 18% provided that the roof is ventilated. Warm deck construction, both sandwich and inverted, will produce decking moisture contents in the range of 9 to 14%.

5.3 Ventilation

To help to control condensation, ventilation of the roof space is covered by recommendations in BS 5250 (Control of condensation in buildings). Plywood can arrive on site with a low moisture content (not more than 8 to 10%) because of the high temperatures used for gluing the veneers. This makes the product suitable for installation in unventilated roof structures such as warm deck constructed flat roofs.

Adequate ventilation of plywood sarking in timber pitched roof constructions may be achieved in practice by providing ventilation gaps of 25 mm minimum continuous opening at the eaves on opposite sides of the building. Where this is not possible in lean-to, mono-pitch or multi-bay pitched roofs, high-level ventilation should be provided equivalent to a continuous opening of 5 mm in addition to the low-level provision. Ventilation gaps at the eaves are usually provided in the soffit board with a small-gauge metal mesh to prevent the access of insects and birds. High-level ventilation may be provided by special tiles. A clear airway between the sarking and any roof insulation of at least 25 mm (50 mm for a room-in-the-roof) must be provided during construction and throughout the service life of the building. This is best achieved by separating the two elements using continuous boarding attached to the underside of the rafters.

5.4 Details

In addition to the plywood sarking, which provides a very good bracing solution for trussed rafter roofs, the roof should be fixed to the supporting walls and to gable end walls. This braces the walls as well as preventing uplift of the roof structure and transmitting wind loading on the gable ends into the roofing members. This may be achieved, as shown in Approved Document A, clause 1C37, using galvanised mild steel or other durable metal straps which have a minimum cross-section of 30 mm × 5 mm. Fixing should be incorporated at not less than 2 m intervals; details are shown in Figure 3.

The provision of plywood sarking (see section 3.5) allows many of the roof