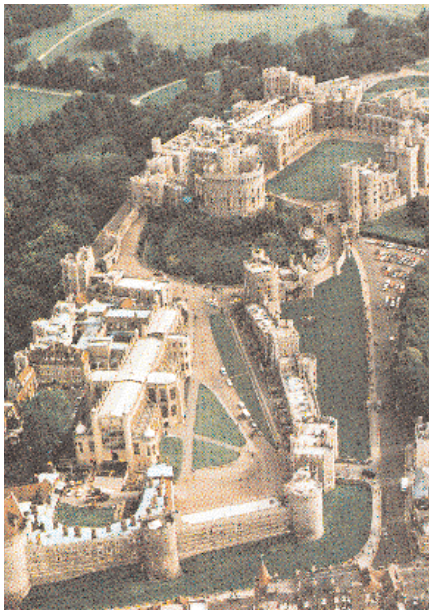
ROOFING DETAILS

The general arrangement details and the principles to be followed at skirtings, upstands, abutments, verges, gutters and expansion joints are as details illustrated.



SELECTION PARAMETERS

It is important that consideration is given at an early stage to the following:

a) The type of roof construction to be employed
b) How anticipated movement is to be accommodated and the locations of any movement joints
c) What trafficking, if any, is anticipated
d) The means by which the requirements of the Building Regulations are to be met, particularly the maximum thermal transmittance values of the Building Regulations
e) How condensation problems are to be prevented
f) Detail considerations
g) Roof drainage
h) What cross falls and/or falls are required to achieve a minimum finished fall of 1:80
i) How skirting heights and minimum threshold heights are to be incorporated
j) The correct location of damp-proof courses relative to the mastic asphalt waterproofing
k) Sufficient working space for the application of materials
l) Any other relevant information.

Design of the base

GENERAL

Surfaces to which mastic asphalt is to be applied should be installed or prepared to a true and even surface free from irregularities such as abrupt changes in levels, hollows, ridges, dips, concrete, mortar or plaster droppings. The specification should, therefore, enable the asphalt to be supplied to a reasonably uniform thickness.

All materials should provide a substantial and continuous support to the mastic asphalt roofing and should be able to sustain the loads imposed by traffic both during and after roofing operations.

Any substrate to receive mastic asphalt roofing should be reasonably dry, even, free of dust, laitance, grease, dirt, projecting nail heads, sharp arrisses or holes.

The designer should study the need for movement joints in the structure. Movement joints should be continuous through vertical upstands, walls and edges of buildings.

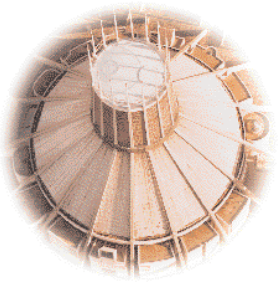
DRYING OUT THE BASE

Concrete slabs and concrete decks cast in situ should be drained downwards through temporary drain holes formed in the low points of the roof deck. Subject to checking their effect on structural strength, the holes should be 25mm diameter, positioned to avoid reinforcement bars in the

concrete in accordance with BS 6229:1982. The holes should not be filled until seepage and dampness has ceased, before finishing work on the ceiling is commenced. Precast concrete roof decking units with open joints are self-draining and holes are not required, but if the joints are subsequently to be sealed, they should be left open for as long as possible.

FALLS

The falls should normally be provided in the base on which the roof covering is to be laid. To ensure adequate drainage, allowance should be made for normal construction tolerances and deflections in order to achieve a minimum finished fall of 1:80. Particular attention should be paid to areas subject to pedestrian traffic such as access balconies or playing areas.



By choosing asphalt roofing adequate drainage is achieved by using a minimum finished fall of 1:80. It should be taken into account that other flat roofing materials usually require a minimum fall of 1:60 resulting in direct additional construction costs.

DRAINAGE

Drainage should be provided and designed in accordance with the requirements of BS 6367:1983, Code of Practice for drainage of roofs and paved areas. Outlets should always be located at the level of the waterproof membrane and, except on small roofs, a minimum of two outlets should be provided. The type of outlet used should be suitable for use in conjunction with mastic asphalt.

Fort George - Inverness

SUBSTRATES

CONCRETE

For in situ concrete or hollow block/pot constructions with an irregular surface, all falls except when provided as part of the structure should be formed by a screed as given in BS 6229:1982. The surface should be provided with a float finish to a plane even surface free from ridges and indentations.

PRECAST CONCRETE UNITS

Precast concrete units should be used and fixed in accordance with manufacturer's instructions and finished with a surface suitable to receive mastic asphalt.

Falls should be incorporated in the supporting structure or formed in a suitable screed.

CEMENT & SAND SCREEDS

Where a reinforced concrete roof slab is overlaid with a screed to provide falls, such screed should be laid in accordance with BS 6229:1982. The surface should be provided with a float finish, even and smooth, free from hollows and ridges.

The screed should be designed to remain free from cracks.

LIGHTWEIGHT SCREEDS

All lightweight screeds should be installed by contractors specialising in such work, laid in accordance with manufacturer's instructions to a smooth and even surface, free from hollows and ridges.

TIMBER BOARDING

Roof decks of timber boarding should be designed in accordance with BS 6229:1982 and BS 5268: Part 2:1996. The timber should be naturally durable or pre-treated against infestation by wood boring insects and fungal decay as recommended in BS 5268: Part 5:1989. Any method of pre-treatment specified should be compatible with the use of bitumen-based products.

Boarding should not be less than 19mm nominal thickness, planed, closely clamped together with tongued and grooved joints or closely butted and secured by nailing with heads not protruding. Falls should be formed by firring or sloping the joists, in accordance with BS 6229:1982.

To avoid fungal attack of the timber boarded structures in cold roof constructions, ventilation should be provided within the roof void.

Adjacent to masonry walls, parapets and abutments, a free standing kerb should be securely fixed to the roof deck to allow for differential movement, and fixed so as to leave an air space between the wall and base.
The timber base should be protected from rainwater during construction. Timber affected by dampness should be allowed to dry. Therefore, the fixing of ceilings should be delayed as necessary.

In cold roof constructions, ventilation should be provided within the roof void.

PLYWOOD

Roof decks of plywood should be designed in accordance with BS 6229:1982 and BS 5268: Part 2:1996. Falls should be formed by firring or sloping the joists.

The plywood should conform to the relevant requirement of BS 6566: Parts 1 to 8, should be specified as veneer plywood and should:

a) Be WBP bonded in accordance with BS 6566: Part 8:1985 (1991)
b) Have a plywood durability of Class M of BS 6566: Part 7:1985 (1991) or higher, or alternatively be preservative treated at least to the minimum requirement of BS 6566: Part 7:1985 (1991). Any treatment should be compatible with bitumen over prolonged periods.

NOTE: It is not normally necessary to specify a plywood of appearance quality higher than Grade III of BS 6566: Part 6:1985 (1991).

Plywood for roof decks may be square edged or tongued and grooved. Longitudinal joints should occur on the centre line of supporting joists. Cross joints should be staggered and in the case of square edged boarding, require additional support, e.g. by noggins. For thinner sheets, stiffness can depend on ply grain direction. Such sheets should, where possible, be laid to obtain maximum stiffness at right angles to the joists. Panels supported on a timber structure should be fixed using ring shank nails at 300mm centres.

Panels should be checked with a moisture meter before installation and, if possible, laid at a moisture content of 14% to 18%. A joint gap of 1mm per metre of the panel size should be allowed. Plywood with a moisture content greater than 18% should not be laid.

Adjacent to masonry walls, parapets and abutments, a free standing kerb should be securely nailed to the roof deck to allow for differential movement and fixed so as to leave an air space between the wall and base.

The plywood base should be protected from rainwater during construction. Plywood affected by dampness should be allowed to dry. The fixing of ceilings should therefore be delayed as necessary.

In cold roof constructions, ventilation should be provided within the roof void.

PROFILED METAL DECKING

Proprietary systems of troughed decks to be used in combination with mastic asphalt should be designed in accordance with BS 6229:1982.

The maximum permissible deflection as a multiple of span should be 1/325.

Metal decking does not provide a continuous supporting surface for mastic asphalt roofing, therefore the decking should be overlaid with a rigid board or sheet material secured to the crowns of the decking profile.

Adjacent to masonry walls, parapets, abutments and metal cladding, a free standing kerb should be securely fixed to the metal decking to allow for differential movement and fixed so as to leave a space between the abutment and the base.
In circumstances where limited vapour control is required, a vapour control layer may be formed of felt conforming to BS 747:1994 or other similar material. If higher degrees of vapour resistance are necessary, a two-layer or a fully supported vapour control layer should be installed.

WOOD WOOL SLABS

Roof decks of wood wool slabs should be formed from slabs conforming to Type SB of BS 1105:1981 (1994), not less than 50mm thick with a pre-screeded surface, fixed in accordance with the wood wool slab manufacturer's instructions.
Pre-felted wood wool may be used to provide temporary weather protection and a vapour control layer in warm roof construction, and should be used in conjunction with a boarded insulant. Joints should be taped.

Where pre-screeded channel reinforced wood wool slabs are specified, the channel may form a thermal bridge unless protected on the outside by insulation. To reduce the risks of condensation, a warm system should be constructed by applying a suitable insulation over the wood wool slabs with a vapour control layer.

Adjacent to masonry walls, parapets and abutments, a free standing kerb should be securely fixed to the wood wool deck to allow for differential movement.

SUBSTRATES FOR INVERTED ROOFS

Substrates for inverted roofs are usually designed to be constructed in concrete due to weight considerations. It is possible to lay over other substrates dependent on their ability to accommodate the imposed loadings.

SUBSTRATES FOR WARM DECK ROOFS

Substrates in warm deck roofs will be formed by thermal insulation boards. Thermal insulation thickness and the risk of condensation build-up should be calculated. The provision of a vapour control layer should be incorporated, if required.

Where warm roofs are installed on substrates with thermal insulation properties, such as wood wool, the insulation manufacturer should be consulted with regards to the provision and positioning of a vapour control layer.

Thermal insulation boards for use in warm roofs should be capable of resisting permanent deformation or damage when subjected to loads.

Roof terraces or balconies subjected to static or pedestrian loads should be designed to accommodate the inverted roof system or consideration should be given to the incorporation of a suitable light coloured tile which will also provide a heat sink layer.

KEYING TO VERTICAL AND SLOPING SURFACES

When mastic asphalt is applied to vertical and sloping surfaces, including skirtings and upstands against brickwork, stone or concrete, the top of the mastic asphalt shall be tucked into a continuous chase of 25mm x 25mm formed in the structure and its exposed part should be formed with a splay to shed rainwater, or continued horizontally to form a mastic asphalt capping.

Mastic asphalt will not adhere satisfactorily to vertical and steeply sloping surfaces unless such surfaces afford an adequate key.

CONTROL OF WATER VAPOUR

Any provision required to control interstitial condensation within the roof should be determined as recommended in BS 6229:1982 but with calculation method modified to conform to BS 5250:1989 (1995).

ATTACHMENT OF THERMAL INSULATION BOARDS IN WARM DECK ROOFS

The boards should be bedded in hot bitumen to the vapour control layer with joints close butted and cross joints staggered.

An adequate margin should be provided between insulation boards and all skirtings and abutments to allow for an infill.

Mastic asphalt roofing

GENERAL

The number of coats should be appropriate to the waterproofing requirements and traffic conditions of the roof. When laid to falls of 1:80 or greater mastic asphalt roofing is laid in two coats to a thickness of 20mm, all in accordance with BS 8218:1998.

Where falls are less than 1:80 or a 'buried' specification is required, three layers of mastic asphalt to a total thickness of 30mm should be applied.

HORIZONTAL, SLOPING AND VERTICAL SURFACES

HORIZONTAL SURFACES UP TO AND INCLUDING 10° PITCH

On horizontal surfaces up to and including 10° pitch the mastic asphalt should be laid in two coats to a thickness of 20mm on a separating membrane of sheathing felt.

In general, difficulties can be experienced in laying mastic asphalt directly over insulants to surfaces over 5° pitch.

SLOPING AND VERTICAL SURFACES OVER 10° PITCH, OTHER THAN TIMBER OR LIGHTWEIGHT CONCRETE AND EXCLUDING SKIRTINGS.

On sloping and vertical surfaces over 10° pitch the mastic asphalt should be laid in three coats to a thickness of 20mm without a separating membrane.

SLOPING AND VERTICAL SURFACES OF TIMBER OR LIGHTWEIGHT CONCRETE OVER 10° PITCH, INCLUDING SKIRTINGS

On sloping and vertical surfaces of timber or lightweight concrete the mastic asphalt should be laid in three coats to a thickness of 20mm on expanded metal lathing over a separating membrane of sheathing felt.

HORIZONTAL SURFACES DESIGNED AS ROOF GARDENS, RESERVOIRS OR BURIED WATERPROOFING

Horizontal surfaces when designed as a roof garden, reservoirs or as a buried waterproofing membrane, the mastic asphalt should be laid in three coats to a thickness of 30mm over a separating membrane of glass fibre tissue.