



Construction and surfacing of car parking areas including private drives

Nearly all roads in this country are surfaced with asphalt*, the merits of which - good strength, durability and weather-resistance, ease of maintenance and repair, and neat, low-glare appearance providing good contrast to road-marking paint - make them equally suitable as surfacings for private drives, car parks and parking areas for heavier vehicles.

There is a wide variety of asphalt specifications to meet the wide range of their use: airfields, motorways, general purpose roads, estate roads, parking areas, footpaths and other paving. This information sheet, used in conjunction with the relevant British Standards, is aimed at helping specifiers to choose appropriate specifications for car parking areas and private drives.

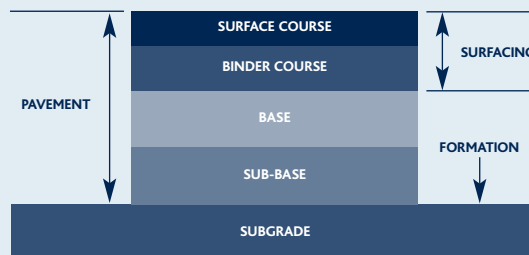
If a parking area is used by heavier vehicles than it was designed for, damage to the construction is likely to occur. It is therefore necessary to ensure that the design is adequate for the potential use. For heavy vehicles a more substantial construction is required than is suggested here: a companion information sheet is available in this series dealing with the construction and surfacing of parking areas for medium and heavyweight vehicles¹.

Note Where the parking area also serves as the roof of a building or is a suspended deck or ramp where waterproofing is involved, special techniques are necessary and it is recommended that advice be sought from the Mastic Asphalt Council, PO Box 77, Hastings, Kent TN35 4WL.

General

The following guidelines relate to new construction. Guidance on resurfacing an existing paved area is given in another Information Sheet in this series². In all cases reference should be made to the current editions of the appropriate British Standards.

N.B. The terminology used in this guide for the structural elements of the pavement, as illustrated here, is that adopted for use in forthcoming European Standards. Surface course was previously known as wearing course, binder course was known as basecourse and base was known as roadbase.



* To accord with accepted European terminology, the term 'asphalt' used in this publication, unless accompanied by a descriptor such as 'hot rolled' or 'mastic' is used in its generic sense to refer to the range of asphalt and coated macadam mixes traditionally used in the UK.

Drainage

The importance of the provision of adequate pavement and subsoil drainage cannot be overemphasised.

When the water table is high the provision of subsoil drainage should be considered. For surface water drainage purposes it is recommended that the paved area should have a minimum general fall of 1.7% (approximately 1 in 60) while external channels leading to gulleys should have a gradient of not less than 0.8% (approximately 1 in 120) for hand-laid work, or 0.7% (approximately 1 in 150) for machine-laid work. Any channels within the paved area should have a gradient not flatter than 1% (1 in 100).

Subgrade

The subgrade should be shaped to the falls required on the finished surfacing to ensure that the overall construction is of uniform thickness. Before final shaping, any weak areas of soft clay or peat should be excavated and replaced with more suitable soil or sub-base material. If the subgrade is to be exposed for some time and particularly if it is clay, the question of protecting it against ingress of water should be considered. Failure to provide this protection can lead to a seriously weakened subgrade if wet weather is experienced during the work.

Sub-base

The sub-base has two functions, one to provide a working platform for construction traffic and the other to increase

the intrinsic strength of the construction. For parking areas which will carry only light vehicles there will be many situations in which a sub-base will not be needed. But on clayey soils which become sticky and soft when they are wet it is usual to provide a sub-base of a minimum thickness of 75mm. A greater thickness will be needed with subgrades susceptible to frost damage, where ground conditions are poor or where the parking area is to be used by heavier vehicles than private cars. In cases of doubt it is always worthwhile drawing on the knowledge of road engineers or contractors with experience of local conditions.

Suitable materials for sub-base are clinker, hardcore, quarry waste or other locally available material of known satisfactory quality. The material should be spread, shaped and well compacted to provide an even surface to the required levels and falls.

Base and surfacing construction

A selection of suitable materials for the construction of the base, binder course and surface course, together with recommended compacted thicknesses, is given in the table below:

Layer	Light usage, e.g. private drives, small office car parks		Heavier usage, e.g. public car parks or areas where risks of indentation, tight turning or on-the-spot power assisted manoeuvring, or stray use by heavier vehicles are present	
	Alternative materials	Nominal thickness mm	Alternative materials	Nominal thickness mm
Base	Hardcore (see note 1)	150	Hardcore (see note 1)	200
	Dense base (roadbase) macadam to BS 4987	75	Dense base (roadbase) macadam to BS 4987 ³	100
Binder course (see note 7)	Open-graded binder course macadam to BS 4987	60	Dense binder course macadam to BS 4987	60
	Dense binder course macadam to BS 4987	60	Hot rolled asphalt binder course to BS 594 ⁴	60
Surface course (see notes 2-6)	0/6mm size Stone Mastic Asphalt (SMA)	20	Hot rolled asphalt surface course to BS 594 (see note 5)	40
	0/6mm size medium-graded macadam to BS 4987	20	0/10mm size close-graded macadam to BS 4987	30
	0/6mm size dense macadam to BS 4987	25	0/6mm size dense macadam to BS 4987	25
	0/10mm size close-graded macadam to BS 4987	30	0/10mm size Stone Mastic Asphalt (SMA)	30

A range of brand-named proprietary asphalt mixes is also available for car-parking uses - details are available from individual asphalt producers or contractors.

Notes

- 1 *Hardcore should consist of hard, broken brick, broken concrete, crushed rock, slag or other local material known to be satisfactory. It should be spread to as even a profile as possible and compacted by a deadweight roller weighing not less than 6 tonnes or a vibrating roller of similar compactive effort. The upper surface should be blinded with small gauge material (eg 0/6mm all-in aggregate), preferably of similar character to the hardcore, and compacted to the required levels and contours by the same type of roller. (In the case of brick hardcore from demolished buildings it is essential that all debris, such as wood, metal and plaster, is removed).*
- 2 *Where macadams are hand-spread in areas such as private drives and small car parks where the normal mechanical road paver is unable to operate, relatively soft, workable materials are necessary. Consequently they can be relatively easily marked, particularly in their early life, by abrupt usage or heavy point loadings especially in warm/hot weather. They should therefore be used with care, abrupt vehicle use and on-the-spot wheel-turning being avoided.*
- 3 *When 0/10mm size close-graded and 0/6mm size dense macadams are to be used for heavy usage car parks,*



penetration grade bitumens are considered essential and consequently machine laying of these mixes will normally be required. In the case of the 0/6mm dense macadam used in these situations, while BS 4987 indicates 100/150 or 160/220 penetration grades of bitumen as preferred grades, increased resistance to surface scuffing may be afforded by use of the harder 70/100 penetration grade (not included in BS 4987) as long as full compaction of the macadam can be ensured. Alternatively, consideration should be given to alternative, deformation-resistant materials such as SMA or proprietary surfacings.

4 Bitumen-bound surfacings possess adequate resistance to the occasional oil droppings from satisfactorily maintained vehicles but can be softened and damaged by abnormal oil spillage. Where such a risk is present, such as in areas regularly used for car maintenance, special measures may be required. For more detailed advice on this aspect consult a specialist surfacing contractor (see under 'Laying' opposite).

5 Hot rolled asphalt surface course can provide a smooth-textured finish. If required for increased skid resistance, a roughened surface may be obtained by application of coated chippings in accordance with the recommendations in BS 594.

6 It should be borne in mind that off-road vehicles and the heavier types of car, e.g. people-carriers, may involve higher stresses on the surfacing than normal private cars. The types of materials given in the 'heavier usage' column of the adjacent table would be more appropriate for these.

7 As a general rule either dense macadam or hot rolled asphalt binder course should be used under hot rolled asphalt, close graded macadam or dense macadam surface course.

Decorative finishes

Surface course materials are available to give a coloured finish where required. Further details of these processes are given in another Information Sheet in this series⁵.

Laying

Satisfactory performance of the construction will be obtained only if all layers are adequately compacted. Compaction should be undertaken with a minimum six-tonne deadweight roller or an equivalent vibrating roller. The asphalt layers must be compacted while the material is at an appropriate temperature. Recommendations for temperatures and for laying and accuracy of finish are given in British Standard 4987 for macadams and BS 594 for hot rolled asphalt.

In view of the skill needed in laying asphalt materials it is strongly advised that laying be entrusted to experienced

specialist surfacing contractors. It is also advised that competitive quotations and specifications for work be obtained and compared. A list of specialist surfacing contractors in any area who are members of the Quarry Products Association is available free on application to the address on this publication. It is strongly recommended that work is not entrusted to itinerant or casual callers offering a speedy 'cheap' job, particularly to private householders, for cash. The risk of dissatisfaction is high with little prospect of redress.

Further Advice

General advice on the use of asphalt is available from the address on this leaflet. For more detailed guidance on specific construction and individual site matters advice should be sought from local specialist surfacing contractor members of the Quarry Products Association who will be in a position to take into account local and site conditions and economic considerations.

References

- 1** *Construction and surfacing of parking areas for medium and heavyweight vehicles*, Information Sheet 2, Quarry Products Association, London.
- 2** *Resurfacing of roads and other paved areas*, Information Sheet 3, Quarry Products Association, London.
- 3** British Standard 4987 *Coated macadam for roads and other paved areas*, BSI, London.
- 4** British Standard 594 *Hot rolled asphalt for roads and other paved areas*, BSI, London.
- 5** *Decorative and coloured finishes for asphalt surfacings*, Information Sheet 4, Quarry Products Association, London.

Publications

Apart from this and other information sheets dealing with uses of asphalt, a range of other publications is available from the Quarry Products Association covering aggregate production and processing, lime, ready-mixed concrete, sand & gravel and slag. A full list of these publications may be obtained from the address on this information sheet.

Booklet: "What's in a Road?" (£3.00 per copy - 32 pages) - a general review of the nature and uses of the different materials used in the construction and maintenance of asphalt roads.

Orders for "What's in a Road?" should be accompanied by a cheque/postal order made payable to Quarry Products Association.



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Providing Essential Materials for Britain

The trade association for companies involved in supplying crushed rock and sand and gravel from land and marine sources, asphalt and flexible paving, ready-mixed concrete, silica sand, agricultural lime, industrial lime, mortar, slag, recycled materials and construction and quarrying plant

Gillingham House 38 - 44 Gillingham Street London SW1V 1HU
Tel 020 7963 8000 Fax 020 7963 8001
info@qpa.org www.qpa.org