

# asphalt

applications

9



Miscellaneous uses  
of asphalt



Asphalt  
Information  
Service

## Introduction

The main use of asphalts\* is in the construction of roads, from motorways to private access roads, but other significant uses are in vehicle parking areas (from heavy lorry parks to private drives), sport and recreation areas and in a number of farming applications. Most of these uses are dealt with in other information sheets and booklets produced by the Mineral Products Association. There are, however, other specialised applications of asphalt and this information sheet is intended to provide a brief note of these and an indication of where further information or advice on them may be obtained.

In view of the specialised nature of many of these applications, it is strongly recommended that experienced surfacing contractors be consulted at an early stage in any design work to ensure that any particular proposal is practical and likely to be successful. A list of the surfacing contractors in any area of the UK who are members of the Mineral Products Association can be obtained from the address given on this publication.

*\* The term 'asphalt' is used in this publication and unless accompanied by a descriptor for example "Asphalt Concrete" (AC), 'Hot Rolled Asphalt' (HRA) or 'Stone Mastic Asphalt' (SMA), is applied in its generic sense to refer to the range of mixtures used in the UK.*

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

## Airfield uses



The largest non-highway use of asphalt is for surfacing work on airfields. Most runways on both civil and military airfields in the UK are surfaced with these materials. In the case of runways on airports such as Heathrow and Gatwick, special porous surfacings are used (over high-strength asphalt bases) to ensure rapid dispersal of surface water to reduce the risk of aircraft aquaplaning. At the other end of the scale the runways of small privately-owned airfields are often surfaced with European Standard asphalts to provide a bump-free all-weather surfacing. The design and specification of military airfield runways is the responsibility of the Ministry of Defence whilst the British Airports Authority or municipal airport authorities are responsible for work on the major civil airfields. Most of these agencies produce their own specifications for this work.

Advice on the types of surfacing to be used on private airfield runways can be obtained from major surfacing contractors. It should also be remembered that many other paved areas on airfields, e.g. vehicle parking areas, perimeter roads and aircraft standing aprons, can be surfaced with asphalt, although special mixes will be required where aircraft fuel spillage is likely.

**Note** A separate information sheet in this series gives general advice on airfield uses of the materials<sup>1</sup>.

## Vehicle and driver testing facilities

In road construction, where most asphalt materials are used, two of the main requirements are for high skid resistance and an even riding surface. Motor vehicle test tracks often incorporate sections of asphalt surfacing to provide these requirements, with other construction materials being used to provide deliberately rough, uneven finishes on which to test the mechanical integrity of vehicles.

In the case of driver training, it is often necessary to teach drivers how to control skidding vehicles (e.g. drivers of emergency and public service vehicles). A number of skid pans in the UK can meet this need and many of these are surfaced with asphalt. They usually require only a liberal application of water to produce the desired effect of a surface on which vehicles can readily skid. Specially designed surfacings are needed for this purpose, normally of a dense impervious material relatively rich in bitumen, containing an aggregate of low polished stone value and producing a finish of low texture. These requirements indicate use of a low coarse aggregate content Hot Rolled Asphalt surface course. Two advantages of this type of surfacing on a skid pan are that expensive lubricants are not required to create skidding and, secondly, if a reduction in

skidding properties occurs due to surface wear, this can be readily restored by overspraying the area with a special bitumen emulsion, without the need to replace the surfacing.

**Note** It should be borne in mind that oil products should not be used as lubricants on asphalt surfaced skid pans as this will lead to serious damage to the surfacing.

## Motor/ motorcycle sports facilities



Most international racing circuits are surfaced with asphalt materials. In view of the very high contact and shear-stresses imposed by racing vehicles, the surfacing needs to be of high strength and quality. In addition, the skid resistance properties of the surfacing are usually important, as a surfacing of too low skid resistance will lead to accidents and conversely if too high a skid resistance, tyre wear/cost is increased and drivers are not able to fully exercise their driving skills. The regulatory bodies for both motor racing and motorcycle racing specify standards for track surfacings but these are not too helpful in deciding on the most appropriate choice of asphalt mix. Most racing-track requirements can be met by the asphalt mixes that are available utilising enhanced bitumens to resist the shear stresses and increase durability and the life of the surfacing.

On a smaller scale, go-karting also involves high stresses which can soon result in unpaved circuits being rendered unsatisfactory for use. Asphalt pavings are used most successfully for go-karting circuits however the selection of the type of asphalt mixture used is critical to the performance of the surfacing particularly in the areas of highest stress on low radius bends.

## Cycling facilities



During the 1930's highway engineers incorporated segregated cycleways into some major road construction. However, this trend was soon discontinued and until more recently cyclists have been required to share the main carriageway with other vehicles. However, over the last few years there has been a revival of the idea of providing dedicated cyclelanes including the Sustrans initiative to develop the National Cycle Network. Cycleways have been marked out on a number of urban roads, many being distinguished by the use of a coloured asphalt surface. Elsewhere, new segregated cycleways have been constructed; these are also adopting coloured surfacing in many cases to identify them clearly. The construction methodology of an asphalt cycleway that is segregated from vehicle use can be as that used for a footway.

**Note** A separate information sheet in this series gives advice on the construction and surfacing of footways and cycleways<sup>2</sup>.

Another area of use of asphalt for cycling facilities is in the construction of cycle racing circuits. In view of the high speeds and contact stresses associated with racing cycles, a relatively strong well bound surfacing is required. To avoid accidents caused by loose coarse aggregate particles on the surfacing, a fine textured surface course is normally considered advisable. These requirements indicate the use of a low or zero coarse aggregate content Hot Rolled Asphalt surface course which would normally be laid on a dense Asphalt Concrete binder course.

An alternative surface course would be a 'heavy-duty' fine graded Asphalt Concrete (AC 4 fine surf) made with a relatively hard binder, which can be laid over most types of asphalt binder course, but which will be less durable than the Hot Rolled Asphalt material. Many cycle racing circuits have steep banked curves and special techniques have been developed by experienced contractors for surfacing these, to ensure that the finished surfacing is fully compacted and has an even finish.

## Hydraulic applications

The waterproofing properties of bitumen binders have been recognised from ancient times and aggregate mixtures bound with these binders can produce construction materials having good waterproofing or water-resistant properties.

These properties have been used to advantage over a number of decades in a range of hydraulic applications. For example, for many years asphalt mixes have been used for canal lining, reservoir lining, sea wall construction, coastal groynes and dam construction<sup>3,4</sup> and even the lining of leisure lakes. Dams incorporating asphalt mixes are at Dungonnell, Colliford, Faroe Islands, Marchlyn and Megget. Reservoirs at Shotton, Leamington and Towey have also incorporated asphalt. Another application has been in the lining of liquid waste lagoons and landfill sites.

These are all highly specialised applications of asphalt. Several members of the Mineral Products Association have experience with this type of work, which often requires specially developed plant and equipment and specially designed asphalt mixes. Details of such companies can be obtained at the address given on this leaflet. The Shell Bitumen 'Hydraulic Engineering Handbook' published in 1999 gives much useful information on this specialised topic<sup>5</sup>.

## Asphalt kerbs

British Standard 5931<sup>6</sup> contains guidance on the use of asphalt for producing kerbs in-situ. In this technique, a Hot Rolled Asphalt mix is extruded onto a road substrate through equipment which can be adapted to produce a range of kerb sizes and cross sections. The main use of asphalt kerbs is as a drainage detail at the lower edge of hard shoulders and hard strips on motorways and major roads. Use of asphalt kerbing avoids the safety hazards associated with manual handling of conventional kerb stones also reducing the construction time taken to lay the kerbs.

Utilising the appropriate equipment extruded asphalt kerbs are very simple to lay and can be extruded either onto a binder course or directly onto a road surface. Careful preparation of the surface upon which the kerb is to be extruded is important. Prior to extrusion, the surface should be clean and a bitumen bond coat applied. After extrusion, the newly applied kerbing should be protected from damage by site vehicles.

## Speed humps

On estate roads and roads on business premises speed control humps, more commonly known as 'sleeping policemen' or road humps, are often installed to prevent fast vehicle speeds in situations where such speeds would be dangerous. Most of these humps have been constructed with asphalt to match into existing surfacings. The dimensions, siting and signing of these humps are important - humps that are too abrupt can damage vehicle suspensions and possibly result in occupant injuries or damage claims. Incorrectly sited or poorly signed humps can present similar hazards. TRL Report LR878<sup>7</sup> gives recommendations on suitable dimensions for road humps. Hot Rolled Asphalt is the most appropriate asphalt material to use for hump construction.

## Footways

Footways on housing estates and similar developments are usually constructed in asphalt, as this type of construction is easily excavated and replaced when attention to underground service pipes and cables located beneath the footway is required. Suitable specifications for new asphalt footways are likely to be available from the local Highway Authority who, in some cases (where the footway is to be adopted by the Authority for future maintenance), will need to approve the specification used.

**Note** A separate information sheet in this series gives advice on the construction and surfacing of footways and cycleways<sup>2</sup>.

## Rail-track beds

Asphalt has been used in many parts of the world, particularly in the USA and Italy, as a base under new rail-track, in place of the traditional rail-track ballast. Asphalt is well worth considering when a new rail-track is being laid as, although it will be initially more expensive than the traditional form of construction, it is likely to require far less maintenance.

## Getting the job done

## References

**Important: When referring to any of the documents listed it is essential to check that it is the latest/current edition of that document. This can be readily confirmed by checking the currency of the document on the appropriate website.**

As previously indicated, most of the above uses of asphalt are of a very specialised nature and it is strongly recommended that such work is only entrusted to companies that can demonstrate that they have the required expertise. A number of the specialist surfacing contractors who are members of the Mineral Products Association have experience in the use of the materials in some or all of the above applications and will be pleased to advise on the most appropriate mixes and forms of construction and to quote for and undertake the work.

- 1 **Airfield uses of asphalt**, Information Sheet 10, Mineral Products Association, London.
- 2 **Construction and surfacing of footways and cycleways using asphalt**, Information Sheet 11, Mineral Products Association, London.
- 3 **Bitumen in hydraulic engineering**, Vols 1 and 2, Baron W F Van Asbeck, 1959 and 1964.
- 4 **Colliford Dam**, Proc Inst Civ Engrs, Pt 1, August 1985, pp 689 - 709.  
[www.ice.org.uk/knowledge/knowledge\\_library.asp](http://www.ice.org.uk/knowledge/knowledge_library.asp)
- 5 **Shell Bitumen Hydraulic Engineering Handbook**, Shell International Petroleum Co. Ltd, London, 1999.
- 6 British Standard BS 5931 **Code of practice for machine-laid in-situ edge details for paved areas**, BSI, London
- 7 **Laboratory Report 878 (LR878) Speed control humps on residential roads**, TRL, Crowthorne, Berkshire, 1979. [www.trl.co.uk/library/reports\\_publications/](http://www.trl.co.uk/library/reports_publications/)
- 8 **BSI website for the purchase of European and British Standards and Public Documents**.  
[www.bsiglobal.com/upload/Standards%20&%20Publications/shop.html](http://www.bsiglobal.com/upload/Standards%20&%20Publications/shop.html)

## Information sheets in this series

- 1 The construction and surfacing of car parking areas including private drives and permeable hardstandings
- 2 The construction and surfacing of parking areas for medium and heavyweight vehicles
- 3 Resurfacing of roads and other paved areas using asphalt
- 4 Decorative and coloured finishes for asphalt surfacings
- 5 Choosing a surfacing contractor
- 6 Asphalt surfacings for high stress areas
- 7 Use of asphalt in the construction of games and sports areas
- 8 Farming applications of asphalt
- 9 Miscellaneous uses of asphalt
- 10 Airfield uses of asphalt
- 11 Construction and surfacing of footways and cycleways using asphalt
- 12 European Asphalt Standards and their application in the UK.

## Booklet

### **'What's in a Road?'**

A general review of pavement construction and the different materials that are used for the construction and maintenance of asphalt roads.

Enquiries for orders for 'What's in a Road?' should be addressed to the Mineral Products Association, details on next page.

## Topics in Asphalt

- Asphalt - Road materials with quality
- Roads are 'green' with asphalt

## Publications

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

## Further advice

General advice on the use of asphalts may be obtained from the Mineral Products Association at the address given on this information sheet. For detailed guidance on any site-specific matter, advice should be sought from local specialist surfacing contractor members of the Mineral Products Association.





The Mineral Products Association is the trade association for the aggregates, asphalt, cement, concrete, lime, mortar and silica sand industries.

**Mineral Products Association**

Gillingham House  
38 - 44 Gillingham Street  
London SW1V 1HU  
Tel +44 (0)20 7963 8000  
Fax +44 (0)20 7963 8001  
mpaasphalt@mineralproducts.org  
www.mineralproducts.org



**Asphalt  
Information  
Service**

The Asphalt Information Service has been established to provide information and guidance on UK issues, products and applications of those products.

Whilst every care is taken to ensure the accuracy of the general advice offered herein or given by staff of the Mineral Products Association, no liability or responsibility of any kind can be accepted by the Association or its staff.

© Mineral Products Association November 2009