

Pavements constructed with clay, natural stone or concrete pavers

Part 3. Code of practice for laying precast concrete paving blocks and clay pavers for flexible pavements

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee B/507, Paving units and kerbs, upon which the following bodies were represented:

- Brick Development Association
- British Cement Association
- British Ceramic Research Ltd.
- British Precast Concrete Federation Ltd.
- Cementitious Slag Makers' Association
- County Surveyors' Society
- Department of Transport (Highways Agency)
- Institution of Civil Engineers
- Institution of Highways and Transportation
- Interlay, the Association of Block Paving Contractors
- Interpave the Concrete Block Paving Association
- Landscape Institute
- Society of Chemical Industry
- Stone Federation

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

- British Civil Engineering Test Equipment Manufacturers' Association
- Institution of Structural Engineers
- National Federation of Clay Industries Ltd.
- National Paving and Kerb Association

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Foreword

This Part of BS 7533 has been prepared by Technical Committee B/507. It supersedes BS 6677 : Part 3 : 1986 and BS 6717 : Part 3 : 1989, which are withdrawn.

Technical Committee B/507 intends to revise BS 7533 in the following Parts.

Part 1	<i>Guide for the structural design of heavy duty pavements constructed of clay pavers or precast concrete</i>
Part 2	<i>Guide for the structural design of lightly trafficked pavements constructed of clay pavers or precast concrete paving blocks</i>
Part 3	<i>Code of practice for laying precast concrete paving blocks and clay pavers for flexible pavements</i>
Part 4	<i>Code of practice for the construction of pavements of precast concrete flags and natural stone slabs</i>
Part 5	<i>Guide for the design of pavements (other than structural aspects)</i>
Part 6	<i>Code of practice for the construction of pavements — Kerbs, channels and edgings</i>
Part 7	<i>Code of practice for the construction of pavements of natural stone setts</i>
Part 8	<i>Guide for the structural design of lightly trafficked pavements constructed of precast concrete flags or natural stone slabs</i>

BS 7533 : 1992 will be withdrawn on the publication of Parts 1 and 2.

As a code of practice, this British Standard takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 15, an inside back cover and a back cover.

Code of practice

1 Scope

This Part of BS 7533 gives recommendations for the laying of precast concrete paving blocks conforming to BS 6717 : Part 1 and for clay pavers conforming to BS 6677 : Part 1 intended for flexible pavements for roads, industrial areas and other paved surfaces subjected to all categories of static and vehicular loading and pedestrian traffic. Recommendations for repairs and reinstatement are given in annex A.

The principles given apply to all shapes and sizes of paving units covered by BS 6717 : Part 1 and BS 6677 : Part 1, although the figures in this code of practice all show rectangular paving units.

2 Normative references

This incorporates, by dated or undated reference, provisions from other publications. These normative references are made at the appropriate places in the text and the cited publications are listed on the inside back cover. For dated references, only the edition cited applies; any subsequent amendments to or revisions of the cited publication apply to this Part of BS 7533 only when incorporated in the reference by amendment or revision. For undated references, the latest edition of the cited publication applies, together with any amendments.

3 Definitions

For the purposes of this Part of BS 7533, the definitions given in BS 6717 : Part 1, BS 6677 : Part 1 and BS 6100 : Part 2 apply, together with the following.

3.1 paving unit

Either a concrete paving block or a clay paver.

3.2 creep

Horizontal movement of units, resulting from the action of braking, accelerating or cornering forces imposed principally by vehicular traffic.

3.3 edge restraint

Device that serves to prevent lateral movement of paving units and to prevent loss of the laying course material.

3.4 intermediate restraint

Device that is used to provide restraint of paving units at intervals of the paving surface.

3.5 interlock

Effect of frictional forces between paving units which prevents them moving vertically in relation to each other.

3.6 laying course

Layer of sand on which paving units are bedded.

3.7 laying face

Working edge of the surface course to which paving units are being placed.

3.8 roadbase

One or more layers of material placed above the sub-base that constitutes a structural element of a flexible or composite pavement.

3.9 sub-base

One or more layers of material placed immediately above the subgrade.

3.10 subgrade

Part of the soil, natural or constructed, that supports the loads transmitted by the overlying pavement.

3.11 capping layer

Layer of granular or treated material at the top of the subgrade to provide a working surface and an improved foundation for the pavement, and to provide a wearing platform during construction.

3.12 surface course

Layer of interlocked paving units that acts as a wearing surface and forms part of the structure of the pavement.

3.13 inboard cuts

Cut unit to break a bond to allow the cut at the edge to be greater than one quarter of a paving unit.

3.14 laying pattern

Arrangement of paving units to form specific patterns or bond either for structural requirements or for visual effects.

3.15 jointing sand

Sand applied to fill the joints between paving units.

3.16 joint width

Distance between adjacent paving units or units and restraint.

4 Construction of pavement

4.1 Subgrade, sub-base and roadbase

Construction of the subgrade, sub-base and roadbase, including compaction, should generally be in accordance with relevant current practice as described in the Specification for Highway Works [1] except for reinstatements where reference should be made to annex A.

The subgrade, sub-base and roadbase, if present, should be presented so that:

- the surface levels are within the tolerances given in annex B;
- the longitudinal falls and the crossfalls of the completed pavement allow the water to run off, thus avoiding ponding.

NOTE 1. A minimum longitudinal fall of 1.25 % and a minimum crossfall of 2.5 % are recommended for carriageways using paving units as a channel. For other areas a 1 % longitudinal and 1.25 % crossfall are recommended and for carriageways using proprietary drainage systems a 2.5 % crossfall is recommended with a longitudinal fall as recommended by the supplier.

c) the surface is tight and dense enough to prevent laying course material being lost into it during construction and use;

d) provision is made to prevent migration of the laying course material into the drainage system, e.g. by using a geotextile;

e) the extent of the site preparation includes enough room to provide adequate foundations and backing for any edge restraint.

NOTE 2. Consideration should be given to the drainage of the laying course if there is a risk of a significant hydraulic head of water developing within this layer.

4.2 Restraint

4.2.1 Edge restraints

Edge restraints need to be sufficiently robust to withstand override by the anticipated traffic, to withstand thermal expansion and to prevent loss of the laying course material from beneath the surface course.

The edge restraint should present a vertical face down to the level of the underside of the laying course.

The surface course should not be vibrated until the edge restraint, together with any bedding or concrete haunching, has gained sufficient strength. It is essential that edge restraints are adequately secured.

NOTE 1. Examples are shown in annex C.

At the intersection of different materials, for example paver/bitumen bound material, an edge restraint should be used.

NOTE 2. Typical examples are kerbs, channels, established structures or rigid abutments such as securely fixed paving blocks.

4.2.2 Intermediate restraint

In certain applications, particularly on steep slopes, intermediate restraints might be required. An example is shown in annex C.

NOTE. Experience suggests that these should be at not greater than 15 m centres, depending upon the loadings, traffic, etc.

4.2.3 Temporary restraint

Temporary restraints should be used to prevent paving units moving during construction and are particularly important if a partially completed pavement is to be trafficked or when it is necessary to preserve the integrity of the laying face at the end of the working period.

4.3 Laying course

4.3.1 Material

Naturally occurring sand from the quaternary geological series or sea-dredged sands selected and graded according to use as given in table D.2 should be used. Other material and crushed rock fines should only be used for category IV applications.

NOTE. The laying course should contain no cementitious material which may detract from the flexible nature of the pavement.

4.3.2 Moisture content

The moisture content of the laying course should be uniform. The material needs to be moist without being saturated.

When the sand is squeezed in the hand and the pressure released, the sand should show no free water and should bind together.

If the prepared laying course becomes saturated prior to laying the paving units, it may be removed and replaced, or allowed to dry to an acceptable moisture content. To control the moisture content of a stockpile, covers may be used.

4.3.3 Preparation of laying course

When laying on a sub-base, the target laying course thickness after final compaction should be 50 mm.

When laying on a roadbase, the target laying course thickness after final compaction should be 30 mm.

For laying course tolerances, see table B.1. The laying course material should not be used as a regulating course or to achieve falls and should be uniform in thickness.

One of the following methods of screeding the laying course should be used for concrete block paving.

a) *Pre-compaction*. Spread the material in one layer, compact this layer using a plate vibrator making allowances for the reduction in thickness achieved during compaction, and level the surface by screeding.

b) *Partial pre-compaction*. Spread the material in a loose uncompacted layer to about the required depth below the surface profile. Compact this layer using a plate compactor (see 4.4.4). Spread a further layer of material about 15 mm in thickness and screed it to create a loose surface on which paving blocks can be placed.

c) *Compaction after laying blocks*. Spread the material loose in a uniform layer, and screed it to a thickness required to give the specified design thickness after the paving blocks have been laid and vibrated into place.

For clay pavers, the recommended method of screeding the laying course is method a).

NOTE 1. Where previous experience of a particular material is lacking, a small trial area will be needed to determine the allowance for the sand surcharge.

If any disturbance of the laying course material by pedestrian or wheeled traffic occurs prior to placing paving units, areas of laying course material should be rescreeded or recompacted to achieve uniformity of compaction.

After the careful removal of the screeding rails, the disturbed area should be filled and re-screeded with laying course material using a float and manual compaction.

NOTE 2. During breaks in laying, it can be useful to leave an area of laying course ahead of the laying face.