CONCRETE BLOCK PAVING

Cost comparison between concrete block paving and premix asphalt

A walk-over in cost, looks and durability for Concrete Block Paving

CONCRETE MANUFACTURERS ASSOCIATION
Quality cast in concrete

INTRODUCTION

This brochure gives a cost comparison of Concrete Block Paving and Premix Asphalt Paving done independently in July 2009 in the Gauteng region. The costings are based on three qualities of subgrade and three job types and sizes. Obviously the size and layout of each individual job affects the cost, and for this reason a small sketch is given to indicate what the costing is based on. The classification of subgrade and earthworks layers beneath the paving are based on UTG 2 and for ease of reference this table is reproduced in this brochure.

In a recent cost comparison between Premix Asphalt Paving (PAP) and Concrete Block Paving (CBP) not only did CBP prove, generally, to be the most cost effective option but, because CBP is aesthetically more pleasing and structurally superior, CBP is the preferred choice for a wide range of applications — from car parks and urban roads to heavy duty industrial areas.

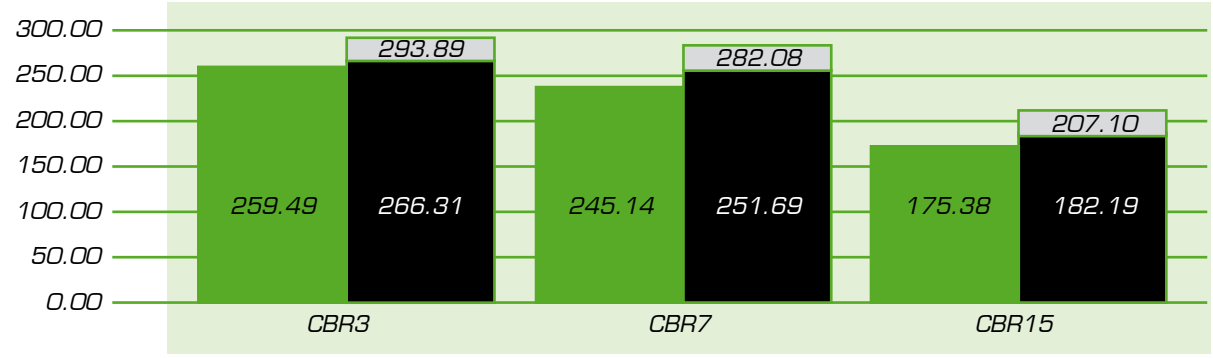
GRAPH OF COST COMPARISON BETWEEN CONCRETE BLOCK PAVING AND PREMIX ASPHALT

Car Parks – Area 3 000m²

CBP Premix Estimated maintenance cost over 10 years

Pavement Cost R/m²

Multi dwelling driveways, car parks and residential streets.

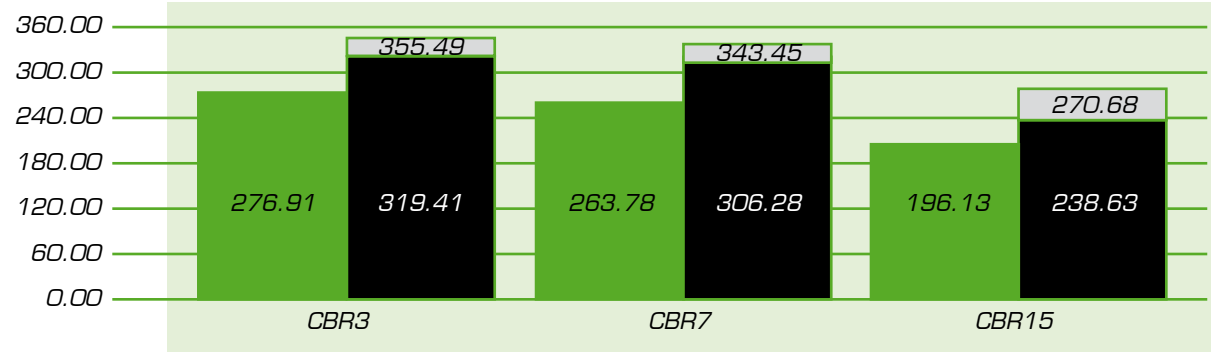


Urban Roads – Area 5 000m²

CBP Premix Estimated maintenance cost over 10 years

Pavement Cost R/m²

Township/Estate road developments and light duty industrial.

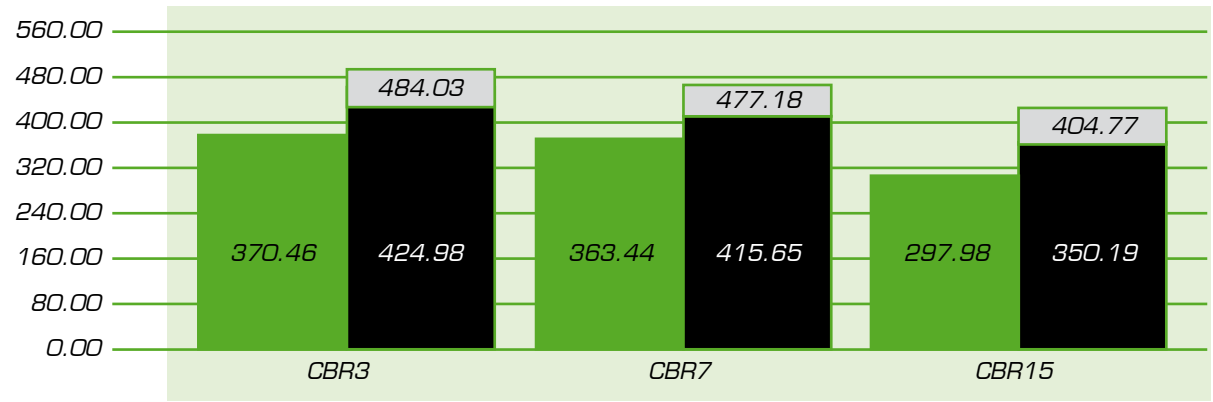


Heavy Duty – Area10 000m²

CBP Premix Estimated maintenance cost over 10 years

Pavement Cost R/m²

Heavy duty industrial, bus terminals and through roads in urban areas.

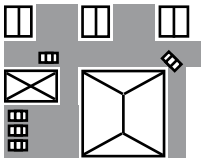


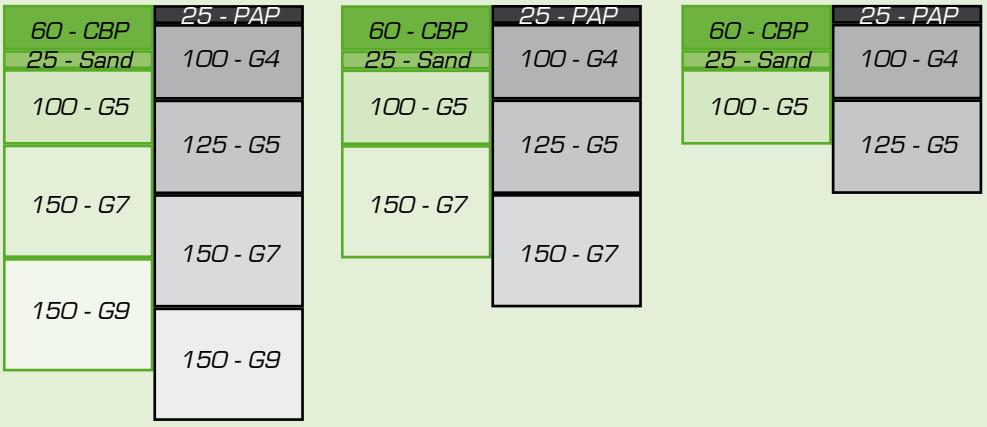
DESIGN SPECIFICATIONS FOR COST COMPARISONS

Car Parks – Area 3 000m²

CBP Premix

Multi dwelling driveways, car parks and residential streets.

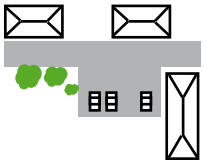


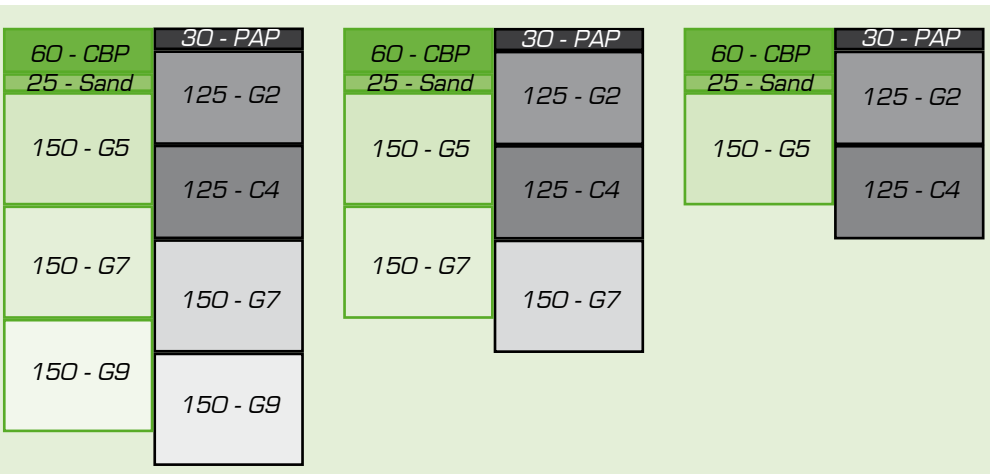


Urban Roads – Area 5 000m²

CBP Premix

Township/Estate road developments and light duty industrial.

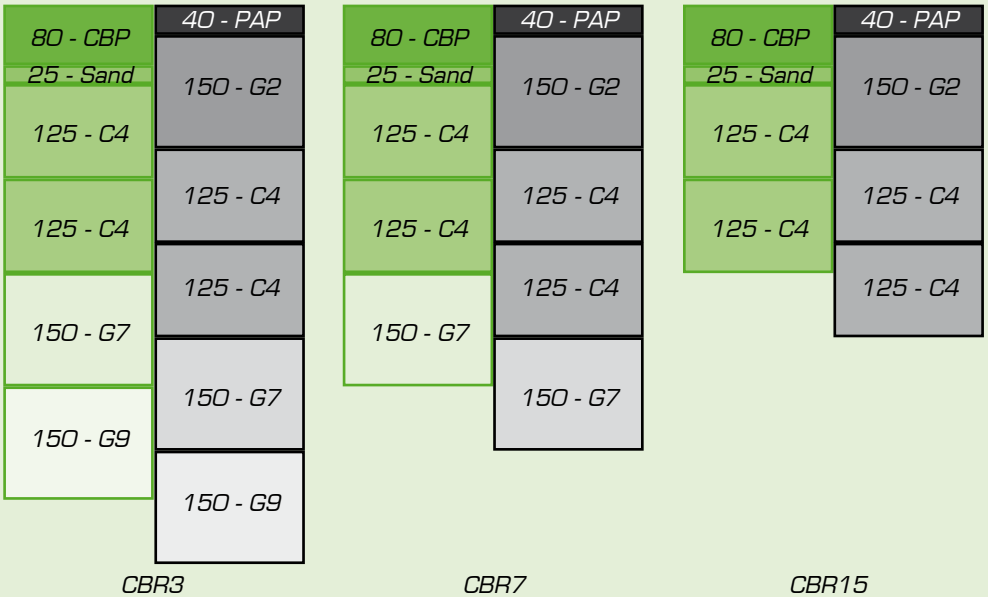




Heavy Duty – Area 10 000m²

CBP Premix

Heavy duty industrial, bus terminals and through roads in urban areas.



The design requirements for CBP and Premix Asphalt Paving differ as CBP is a structural layer whereas PAP is only a surfacing layer and should not be compared in isolation and for this reason the layers required for each are not the same. The final costings are influenced by design, the type of surfacing (CBP and PAP) and the size and intricacy of the job.

NOTES ON THE SPECIFICATIONS

This brochure is intended to be used as a typical cost comparison between types of construction.

It is NOT INTENDED to be used as a catalogue design manual.

The designs used are based on:

Draft UTG 2 : 1987 - Committee of Urban Transport Authorities.

"Structural Design of Segmental Block Pavements for southern Africa."

Draft UTG 3 : 1988 - Committee of Urban Transport Authorities.

"Structural Design of Urban Roads."

The design procedures indicated are not a substitute for engineering skill and judgement and in no way replace the services of experienced professional engineering consultants.

Materials used (e.g. C4 and G7) are the typical material codes used in UTG 2 Fig. 9 and UTG 3.

The costings for the various specifications were based on the size and shape of paving indicated and assumed to be a one-off contract in central Gauteng.

Due to the many factors which may affect the actual price of any specific contract, the costings can only be used as a comparison between relative specifications.

Extract from UTG 2 Fig. 9

Code	Material	Abbreviated Specifications
G1	Graded crushed stone	Dense-graded unweathered crushed stone; max size 37,5mm 86-88% of apparent density; fine PI≯4
G2	Graded crushed stone	Dense-graded unweathered crushed stone; max size 37,5mm 100-102% mod AASHTO; fines PI≯6
G3	Graded crushed stone mod AASHTO; fines PI≯6	Dense-graded stone + soil binder; max size 37,5mm 98%
G4	Natural gravel	CBR 80; PI≯6
G5	Natural gravel	CBR 45; PI≯10 max size 63mm
G6	Natural gravel	CBR 25; max size≯2/3 layer thickness
G7	Gravel-soil	CBR 15; max size≯2/3 layer thickness
G8	Gravel-soil	CBR 10; at in-situ density
G9	Gravel-soil	CBR 7; at in-situ density
G10	Gravel-soil	CBR 3; at in-situ density
C1	Cemented crushed stone or gravel	UCS 6 to 12 MPa at 100% mod AASHTO; Spec at least G2 before treatment; dense-graded
C2	Cemented crushed stone or gravel	UCS 3 to 6 MPa at 100% mod AASHTO; Spec at least G2 or G4 before treatment; dense-graded
C3	Cemented natural gravel	UCS 1,5 to 3 MPa at 100% mod AASHTO; Max size 63mm
C4	Cemented natural gravel	UCS 0,75 to 1,5 MPa at 100% mod AASHTO; Max size 63mm

FURTHER ADVANTAGES OF CBP OVER PREMIX ASPHALT

The many colours and textures available in CBP allow for more versatility in looks and styles than premix asphalt. (Patterns, lines and images may be built into the paving.)

The interlocking action of CBP facilitates far better load distribution than the premix asphalt.

In the event of changes or renovations being made in the paved area, any reclaimed blocks are not wasted, but may be used elsewhere.

If services are required beneath the paving the CBP can be lifted without becoming damaged and can be re-laid without leaving any unsightly scars and at no further material costs.

Add-ons are easily made in any size to match existing paving.

CBP is more resistant to chemical attacks than premix asphalt, particularly in the case of petro-chemicals.

The maintenance costs of CBP are a fraction of those of premix asphalt.

Drainage channels may be built into the design with CBP.

Finishing off around trees, etc., may be made with a header course, which is both attractive and practical.

Safety features, which are particular to CBP, include:

- *High skid resistance*
- *High luminance*
- *Rapid shedding of rainwater*
- *Low traffic noise levels.*

LOW MAINTENANCE COSTS

Concrete Block Paving is more resistant to wear from applied loads than premix asphalt. For this reason CBP is usually the preferred material where the following conditions apply:

- *Heavy industrial loadings are applied to the surface*
- *Stop/start traffic*
- *Turning and slewing wheels*
- *Petro-chemicals or other contaminants in contact with the pavement surface*
- *Cushion or solid tyred wheels*

Furthermore, it is known that asphalt surfaces need to be overlaid after some years of use. UTG 3 indicates that the period of time before an overlay is required may vary between 7 and 15 years. As the premix asphalt surface layer makes up approx. 27% to 37% of the total pavement cost, this is the amount which needs to be added at present costs if an asphalt overlay is required over the life of the asphalt pavement

PAVING DIVISION MEMBERS (September 2009)

PAVING MEMBERS

Bafokeng Concor Technicrete	014 538 0818
Baybrick	035 792 5218
Bosun Brick Midrand	011 310 1176
Brick & Concrete Industries (Namibia)	0026 461 321 3009
Brickcast Industries	031 507 5525
Brickbuild T/A Panda (Botswana)	00267 244 2106
Cape Brick	021 511 2006
C.E.L. Paving Products	021 905 5998
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Kopano	016 363 0340
Kwena Concrete Products (Botswana)	00 267 392 2850
Mobicast Mossel Bay	044 874 2268
MVA Bricks	012 386 0050
Neat Contech	046 624 3377
Stanger Brick & Tile	032 457 0237
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Vanstone Precast	012 541 2056
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PYW Paving	031 763 5771
Roadstone Civil & Paving	011 683 7080
S A Paving Gauteng	011 483 1350
The Paving Creations	031 765 4083
Vesles Civils	012 662 3030/1
Valcal International	011 867 2471

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