CHOICES OF CONCRETE BLOCK PAVEMENTS BY EXTERNAL APPEARANCE

Tadao Kunimura
Sanyo Co., Ltd.
Kandacho 5*11, Yamaguchl-shi,
Yamaguchi-ken,
Japan

Summary

Concrete block paving is now accepted throughout Japan for a very wide range of application. The growth in its use over the last few years is attributed to mainly the pleasing appearance and good performance.

This paper examines the factors affecting the visual and environmental impact of concrete block paving. The paper reviews the surface characteristics of block pavements. In particular surface colour, texture, and pavement roughness are discussed.

CONSIDERATIONS ON THE CHOICES OF CONCRETE BLOCKS AS A PAVEMENT SURFACE

1. Introduction

There is somewhat of a consensus among city planners that pavement does not play a major role, but rather only a supporting role in overall scene of city streets. Many architects are thought to feel that dramatic designs where the pavement stands out from the surrounding landscape are not good, but instead reserved designs that blend into the surrounding view are desirable.

This desire has been fulfilled by concrete block pavement, a material that has won praise in recent years for a simplicity that permits one to sense the living space within a city and for its ease of use as a living sensitive pavement.

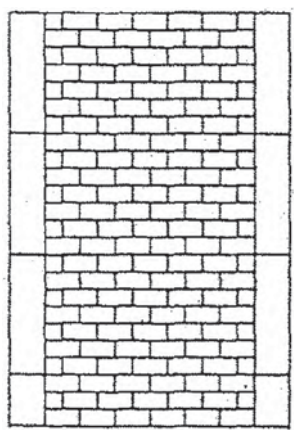
On the other hand, considerable effort has been dedicated to the texture of such block and, as a result, highly decorative type pavements have been attracting wide attention, as a material to meet ever increasing community needs, for example, to add distinction to regions with a high class orientation.

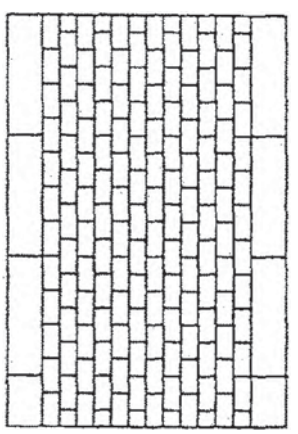
My objective in this article, is to outline the effects of patterns and joints with block pavement shapes and the visual effect of block pavements, to present basic concepts on road surface designs used in block pavement and to take an in depth look at the future direction of block pavement.

2. Block Pavement Forms and Patterns

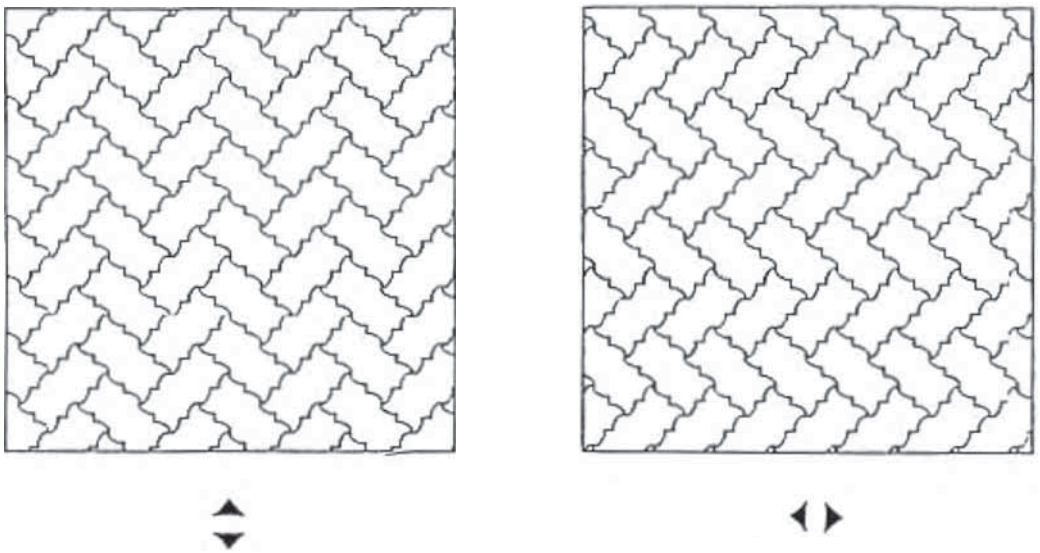
The visual effect of block shapes as individual block is quite different when they are actually laid out. Consequently, it is desirable to visualize the overall image including the width, ground area, shape and surrounding environment of the site to be constructed and then to. decide on the appropriate shape of the block.

For example, when the width is small, if the length of rectangular block is laid out parallel to the width, the effect will be to widen the visual perception of it. When large size blocks, for example, with hexagonal or octagonal are used in sites with expansive shapes, they tend suggest expanse with a sense of stability.





The visual expanse varies depending on the layout of the block



Traffic paths can be made ir. the direction of the arrow

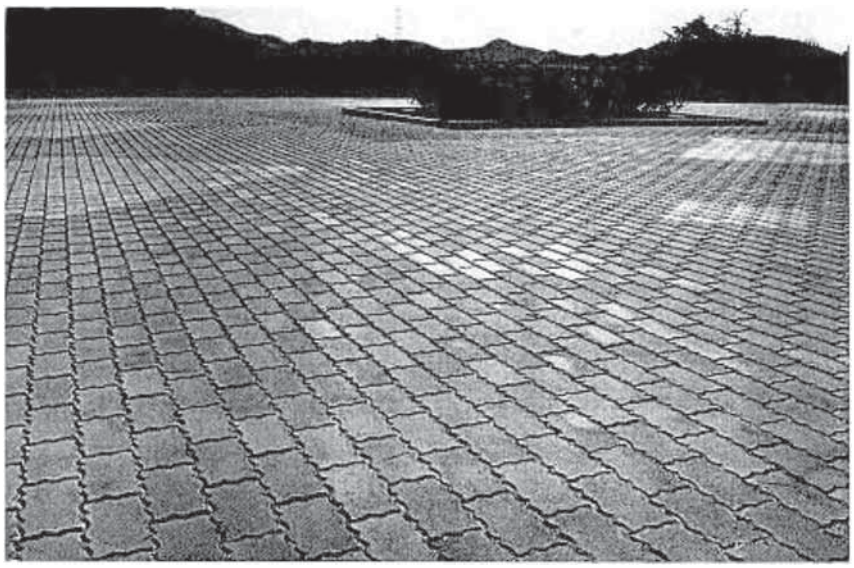


Example of erection using Large size block, it evokes sense of stability

3. Effect of Joints

Joints play a major role in the composing of a block pavement scene. The effect of the shadows of joint sections brings out the shape of the block itself and thus tends to relieve monotony when such blocks have been made into a wide surface. Moreover, joints embedded up to the chamfered

ares of the block pavement serve as an element that further provides a sense of depth to the block. Since joints are made with a directional character, they also fulfill the role of traffic paths.



Light serves to accentuate joints

4. Coloration

The four season nature of Japan is truly diverse. Another notable feature of Japan is its long and richly varied topography extending from north to south. The cities and towns that have been nurtured here have been endowed with their own respective coloration thanks to the people who dwell there as well as local climates and natural features.

If Japan's roads are colored in a manner matched to these cities and the their surrounding environment an accent of variety will be added to hum-drum roads and everyday streets making them both attractive and pleasant.

When equivalent amounts of red blue and yellow are mixed they become "black" and when the three primary colors red, blue and green are mixed they become "white". In their periphery, an infinity of colors is to be found.

A fundamental knowledge of coloration is essential in design planning in order to be able to harmonize the coloring of block pavement with the surrounding landscape.

4-1 Basic Points on Coloration

Coloring was originally born within the man's consciousness and since that time has controlled his physiology and psychology in a variety of ways. "Color" consists of three elements hue (shades of reds, greens, etc.) and brilliance (the degree to which a color is bright) and chroma (the degree to which a color is vivid without mixing), and it inevitably exerts a psychological influence upon us.

4-2 Combination of Agreeable Colors

1 Harmony of sameness ... This is an easy method of coloring through the combination of allied colors alone.

2 Harmony of similarity ... Combinations of color hues that are close to each other such as yellow and brown

3 Harmony of contrast ... Combinations that emphasize color differences such as white and black.

I believe that we, who are associated with block pavement, must give consideration the power of color. Take black and white for example. Slack adds strength to color and white has the power to show something as it truly is. In a jewelry store, a black background is used in order to bring out the beauty of the jewels, and its effect is to bring out their beauty, much more so than could be done with a white background.

Moreover, reds and oranges posses a strong power that induces a vibrant and gay mood. In contrast, blues and purples have a quietly calming affect.

5. Texture

The use of concrete block pavement has spread rapidly, due to such advantages as the high degree of pattern design freedom it offers as well as the flatness and durability of the resulting pavement. Nevertheless, there is a growing need in cities for products that take advantage of the various features of concrete block to provide a more high class surface texture.

5-1 A Product that Provides a Highly Enhanced Surface Texture

1 Products that expose a natural granular gravel on the surface layer of the pavement block (A product that uses a direct washing machine)



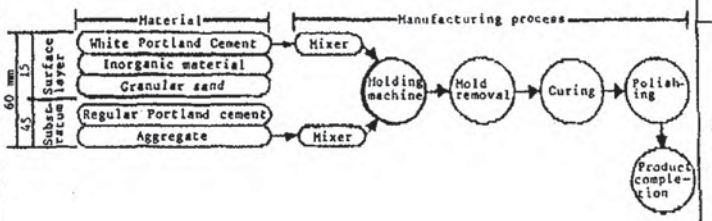
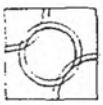
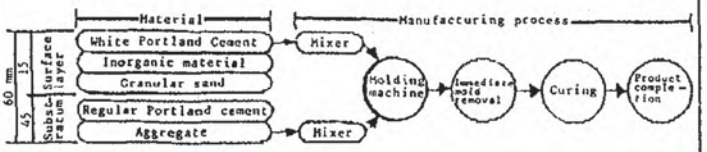
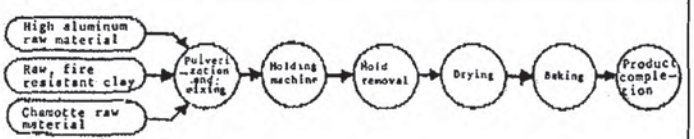
2 **A concrete finished product that brings out a sensation of thickness close to that of natural stone and a quietly reserved atmosphere (Products using the shot blaster machine)**



3 A polished product that evokes a sense of cleanness plus an impression of refinement (A product which a polisher has been used)



Table 1 Outline of Pavement Materials

	Shape and Layout	Surface	Materials and Manufacturing Processes	Others
1	 Width 300 x Height 300 x Thick-ness 60 mm	o Lustrous o Vivid coloring		
2	 300 x 300 x 60	o Lustrous o Vivid coloring		o Various patterns can be enjoyed depending on its plane layout
3	 300 x 300 x 60	o Lustrous o Vivid coloring		
4	 300 x 300 x 60	o Non-slip improvement o Non-lustrous	o Surface section of molding machine Formwork material - hard rubber o Reduction of polishing process	
5	 300 x 300 x 60	o Non-slip improvement o Non-lustrous o Rough surface	o Surface section of molding machine Formwork material - hard rubber o Reduction of polishing process o Use of silica in the granular sand	o Offers substantial abrasion resistance
6	 300 x 300 x 60	o Non-slip improvement o Non-lustrous o Rough surface	o Surface section of molding machine Formwork material - hard rubber o Reduction of polishing process	o Various patterns can be enjoyed depending on its plane layout
7	 300 x 300 x 60	o Non-slip improvement o Non-lustrous o Rough surface	o Surface section of molding machine Formwork material - hard rubber o Reduction of polishing process o Use of silica in the granular sand	o Offers substantial abrasion resistance o Various patterns can be enjoyed depending on its plane layout
8	 300 x 300 x 60	o Non-slip improvement o Non-lustrous o Rough surface		
9	 111 x 225 x 60	o Non-lustrous o Rough surface		o Various patterns can be enjoyed depending on the layout and shape of the block
10	 300 x 300 x 60	o Non-lustrous o Rough surface o Substantial water absorb-tion		o Baked earthen produce

5-2 Pavement Stone Blocks on which Laminated Layers of Concrete Block are Cemented to Natural Stone or Tile

1 Laminated tile blocks

These are composite tile blocks the; combine the design characteristics of tile with the functionality and constructional advantages of block pavement

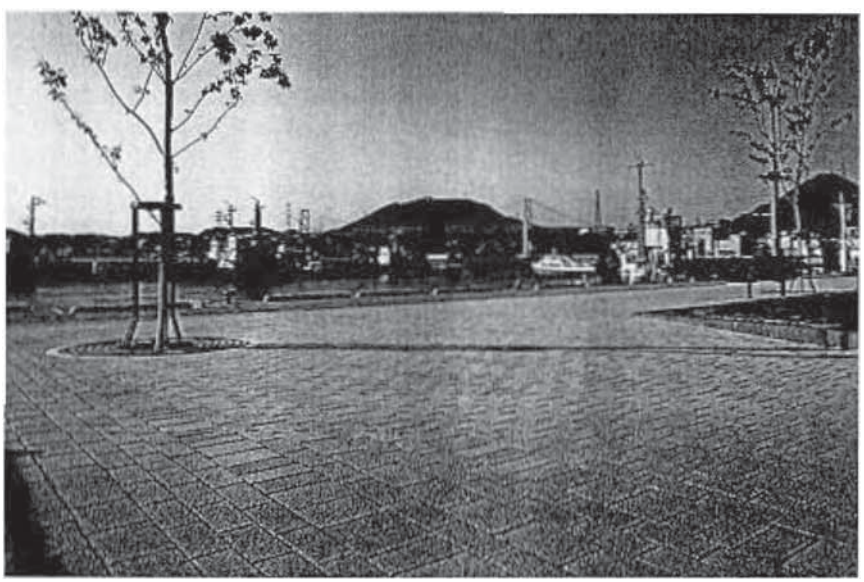
The block structure is made a unified structure by combining the tiles into a dish shaped base block using a special mortar.

2 **Composite natural stone block that combines the high class image of stone with the functionality and constructional advantages of block pavement.**

Table - *2* Comparison of the Wet Type and Dry Type Construction Methods on Stone Pavement for Roads (When pure natural stone is used as the material)

	Wet Construction Method	Dry Construction Method
Pavement structure	Provides a hard pavement and changes in foundation concrete are unlikely to follow	Provides a flexible type pavement and changes in foundation concrete are proone to follow
Construetion	Requires specialized rock construction technology	No special technology required
Conetruction period	Comparatively long	Comparatively short
Curing	Several days are required to dry the concrete mortar	Unnecessary
Maintenance	Repair entails major construction work	Repair is easy and members can be reused.
Price	Construction labor is expensive, but overall it i» less expensive than the dry method.	Member thickness is double that of the wet method. As a result it is also more expensive.

5-3 Products in which the surface shape has been altered through the devising of formworks for concrete block manufacturing machines, so as to give concrete block pavement a more stone-pavement-like appearante



1 Pogorete

When blocks are combined such that various types of shapes both large and small are brought out in pentagonal patterns on the block surface, the resulting product appears as though it were composed of many small individual stones.

It also offers the advantage inhibiting slipping due to the relief formed protruding areas on the block surface.



2 My Appia

In terms of design, this is a product that suggests the image of the Roman Appian Way and that adds roundness to the block surface, thus strongly evoking a soft image.

Seven types of block variations are also available, including rectangular shaped, fan shaped and round shaped.



5. Conclusions

In recent years in Japan the word "amenity" has come to be used with increasing frequency. The meaning of amenity refers to "comfort" and a "comfortable environment" and suggests a city and living environment quality that is based upon traditional layout of houses and stores and abundant greenery.

Under these conditions, the role of roads among the many elements making up the street landscape is considerable. Thus, in addition to investigating material characteristics and structural aspects, it has become important to decide upon a road surface design that adequately considers the visual effect to be provided by the road surface.

Block pavement is a product that offers broad assortment of elements to choose from in composing a road surface (shape, coloring, layout pattern and texture) and that permits a flexible response to road surface design.

I believe that in the future the current of block pavement in Japan will follow two major courses. One will be that of expansion in terms of volume due to the extension of roads such as for ports and harbors, production yards and residential areas. The second will be the development of special applications not possible with conventional asphalt pavement, by providing the block itself with high added value, thus transforming it into a material with outstanding decorative properties.

7. References

1. Shackel, B., An Experimental Investigation of the Response of Interlocking Concrete Block Paving to Simulated Traffic Loading. Aust. Road Research Bd. Research Report ARR 90 1979

2. Shackel, B., and Candy, C., Factors Influencing the Choice of Concrete Blocks as a Pavement Surface, Roma, pp78-85, 1988

3. Kurz, 0., and Dr. Jungk,A., The Use of coloured Concrete in Creative Design, Roma, pp.37-40 1988

4. Miura, M., Yoshida, K., Komura.M. and Saeki, Y., On Lite Serviceability of Concrete Block Paving, Delft, pp212-218. 1988

5. Sasaki, M., Skid Resistance on the Pedestrian Area, ILB Pavement No.6 Chichibu Cement. 1981

6. The Designing and the Colouring of Concrete Blocks, ILB Pavement No, 26 Chichibu Cement Co. Ltd. 1987

7. Clifford, J., The Potential Revolution in Urban Renewal with Concrete Paving Blocks. Roma, pp50-54, 1988