THE PROGRESS OF DESIGN OF INTERLOCKING BLOCK IN JAPAN

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ABSTRACT

The progress in design and the details of usage for landscape of interlocking block in Japan can be roughly classified into the time of poor coloration, the time of coloration development, the time of excessive design patterns, the time of quality development and the time of harmony with environment, then to the present time. From the dawn until about 1985, color-mismatching sites were constructed due to a few selections of colors for blocks but available colors to match various environments were developed and the applications gradually expanded. On the other hand, there were some laying patterns with excessive design and figurative patterns making the entire landscape quite inharmonious and unbecoming. The requirements for quality of interlocking block were getting severer as the streets were getting matured and extensive developments were made on surface textures and shapes of block pursuing perfection to harmonize with surrounding landscape. Today, interlocking blocks taking not only landscape into consideration but also environment have been developed thus interlocking blocks have been progressing as society changes.

1.INTERLOCKING BLOCKS WITH ONLY 6 COLORS

In 1982 or so, there were a few color variations for interlocking block in Japan and gray(cement color), black, yellow, green, red and white were main colors. Due to insufficient color variations, it was difficult to harmonize colors with landscape of streets and natural environment and there were quite a lot of sites unbecoming to the surrounding landscape. As a result, designers at that time evaluated interlocking block very low and the reputations prevailed that interlocking block itself was a poor material despite that its color assortment was simply small.

2.INTERLOCKING BLOCK CAUSING COLOR INHARMONY

The patterns of interlocking block chosen for walkways by the head of a self-governing community was so vigorous in color that people of that community were frustrated to walk on the walkways. That is not only because there weren't enough colors then for matching environment but also because it was amateurs that selected colors, therefore, the conditions for color-harmony were anyway out of question under those circumstances. The process for contractors to decide on colors, that is, an understanding of color-planning was poor and color variations for interlocking block supplied by manufacturers were not enough. But nowadays, there are quite a lot of colors and textures for interlocking block so that it has to be said that the design plan itself must be poor if color and landscape harmony cannot be achieved using interlocking blocks.

3.THE ADVENT OF INTERLOCKING BLOCK PAVEMENT AND THE TIME OF EXCESSIVE DESIGN AFTER THE STUDENT MOVEMENT

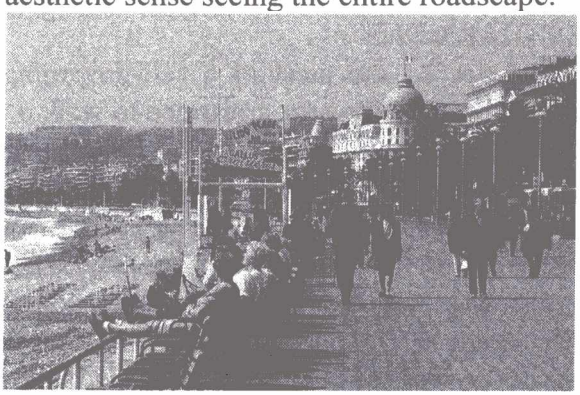
In the student movement in 1970s, concrete flag stones of streets were a handy material which is relatively easily broken into suitable sizes for throwing by the demonstrators and concrete flag stones of many walkways in Tokyo sustained damage. Pavement of walkways in Tokyo at that time was generally done with 30cm x 30cm concrete flags and many streets were paved with concrete flags but pavement of walkways after the student movement was taken over by asphalt. When the student movement subsided, there was an occasion to pave a site with interlocking block near the Tokyo International Airport. The riot police carried out a block-pulling test to cope with a demonstration and interlocking block was evaluated well and paved as they found out that blocks were hard to be pulled out without tools.

The advent of interlocking block which has brighter colors compared to conventional gray asphalt pavement was a convenient pavement material for shopping streets and for self-governing communities all over Japan to pave economically and to enhance their images. It became possible to pattern pavement as interlocking blocks are segmental pavers and interlocking block pavement where they patterned animals like turtles and fish, plants like flowers and pine trees and locally-oriented motifs were often observed. Those patterns were designed to represent a locality but the patterns got so dirty and so banal that negative effects were given to street landscape. Since most of those patterns were not planned taking the entire street environment into consideration, most of them were unbecoming to the surroundings. There were not any such examples using figurative patterns in foreign countries and it could be considered typical of Japan.

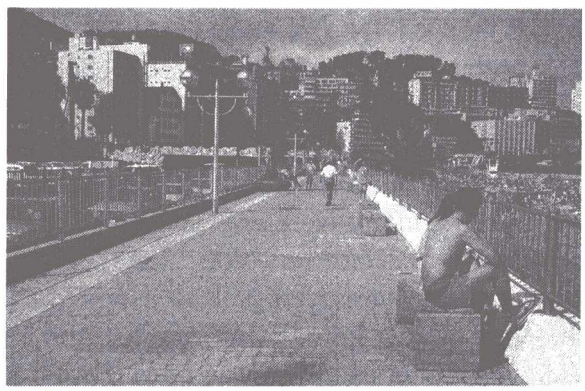
4.COAST OF NIECE AND ATAMI, COMPARISON OF INTERLOCKING BLOCK PAVEMENT

Here are examples of two interlocking block pavement sites the road environment of which is similar to each other. They are the coasts of Niece and Atami. They are different in scale but they have similarities in sectional structure having the sea and beach, adjacent promenades, street trees, roadways and buildings but the laying patterns of interlocking block were found different.

They chose for blocks in Niece moderate colors assimilating with the surroundings, which resulted in making strolling pedestrians, street trees and roadside buildings look better. On the other hand in Atami, they patterned pine trees with blocks motivated by a famous tragedy novel in spite of the real pine tree standing nearby. Though it is understandable that they want to advertise the local tourist site, it is too much for design. It is required to have the general aesthetic sense seeing the entire roadscape.



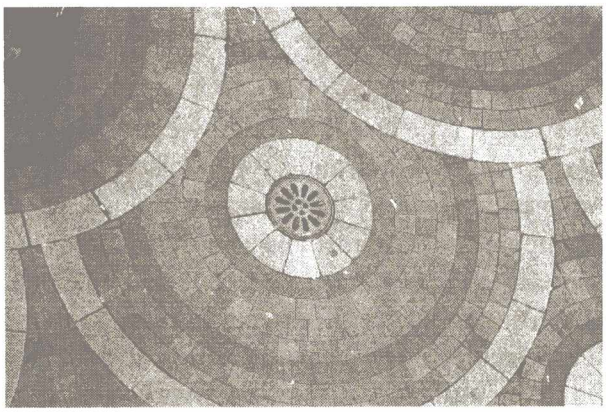
Coast of Nice



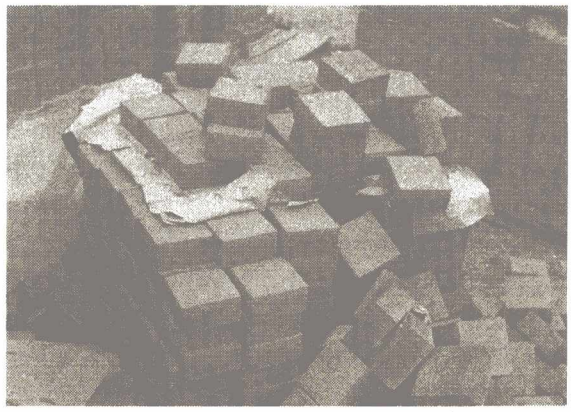
Cost of Atamai(Japan)

5.BEAUTIFU COLORATION OF INTERLOCKING BLOCK IN BORDEAUX, FRANCE HINTING AN OPPORTUNITY TO DEVELOP OLB-COLOR

The author lived in Bordeaux in France for 3 years from 1978 to 1981 and walked everyday on a 1km promenade, St. Catherine Street and never did he doubt the paving material of the street to be natural stone. It was a great surprise to him when he encountered repair work of the street after three years to have found out that the pavement material was concrete. The color was chic, it was easy to walk as the block did not have chamfering, the block was straight type and laid in concentric circles. One of the most impressive things was that it was in perfect harmony with the landscape of the nearby stone buildings. It was because that coloration and patterns were as natural as stone harmonizing so well with the surrounding landscape.

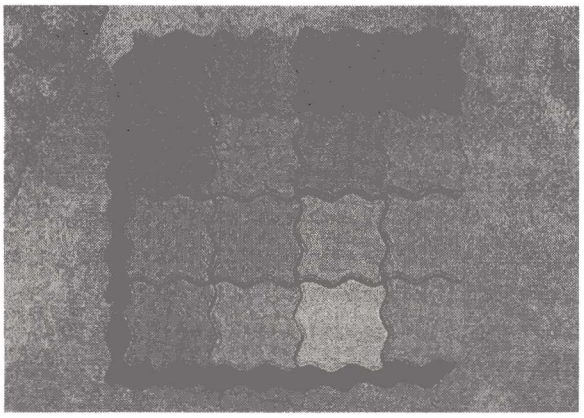


Block of St.Catherine Street (Bordeaux)

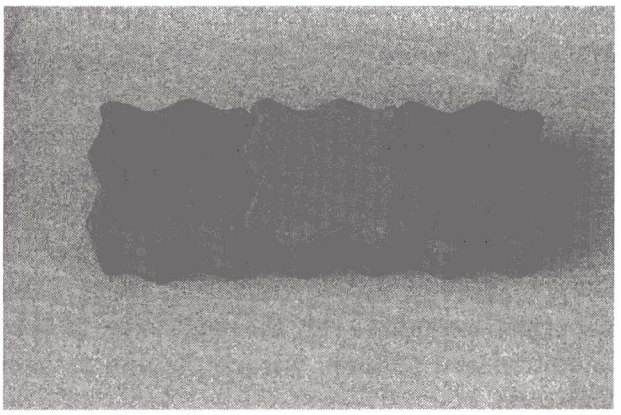


Detaile of Block

The author returned to Japan right after he saw the concrete block in France and he was very shocked with seeing bright 6 colors of interlocking block produced at that time in Japan.
It was really surprising to see patterned interlocking block pavement using vivid complementary colors like red and green after seeing in France blocks in natural and warm color harmonizing so well with the surroundings just like a continuation of carpet in the house.
The author, having been learning design, kind of felt social duty as a designer. He explained the actual situation of interlocking block in France to managers of a large cement company(now Taiheiyo Cement Corporation) and had them recognize the difference in color between France and Japan. He began to develop new coloration. There were only 6 colors for interlocking block at that time and the reputations of interlocking block among designers were not very good. In order to make fit to any roadscape, a series of 4 color system called OLB colors based on brick color, brown color, gray color and violet color each of which has 4 kindred color shades totaling 16 color shades were invented. Color selections to suit to environment were widened and if they lay blocks of color combinations within the system, the acceptable evaluation on coloration was obtained even without designing experiences. 3 color combinations within the system were recommended and accepted. Contractors and designers recognized the color system and it gradually gained popularity.
Nowadays, in maturing urban environment, the 16 colors do not seem to be sufficient with more sensitive colors and textures demanded and manufacturers are responding to the demands with more colors and textures.



16colors interlocking block



3color combinatinos

6.STRAIGHT TYPE AS THE MAINSTREAM FOR WALKWAYS

Most of interlocking block used for walkways are straight type and it is roughly classified that straight type for walkways and dentated type for roadways. But straight type is used for light traffic roadways and straight type seems to be preferred from the design point of view. Dentated type gives more artificial impressions compared to straight type and gives annoying impressions from visibility point of view. When interlocking block began to be used in Japan, dentated type was used for walkways, too and each manufacture produced its own dentated type of block trying to segregate from others. But today more emphasis on colors and surface textures of block than shapes of block is put and manufacturers tend that way, too. It is because that there are social needs of how to harmonize with surrounding environment and how to create qualitative roadscape and interlocking block also requires a change in association with maturing of cities and a change in social environment.

7.INTERLOCKING BLOCK WITH DIVERSIFIED SURFACE MATERIALS

A change in interlocking block in Japan from the design point of view has gone through the time of poor coloration with only a few colors, the time of increasing colors, the time of configuration development pursuing size and shape of block and the time of development of surface aggregate pursuing appearance and texture of the surface, that is, the time of consideration for environment, then to the present time of consideration for environment including recycling. Such is the social flow of interlocking block today. There is a lot of kind of interlocking block produced today and it is classified as follows from the qualitative design point of view.

It is classified into normal interlocking block, block with rough surface textures, block using crushed stone for surface aggregate, block with resin mixed in surface aggregate, block laminated with tiles and stone materials, permeable block with voids for permeability and block with residues from incinerators and factories recycled. The variations of those kinds of block are interlocking blocks used now in Japan with plenty of colors, shapes and textures to cope with various environment. Especially the environmental issues are recently considered to be very important and crucial subjects. Block provided with such environmental factors as considerations for barrier-free, permeable block which reduces load on rivers by making rainwater permeate into underground, drainage pavement with the object of reducing noise and preventing splash on roadways, permeable pavement with the object of considerations for the ecological system by making rainwater permeate into underground and recycled block with the object of reducing trashes is socially helpful and needed more and more. The priority

is given to the design taking those environmental factors into consideration.

Category of Interlocking Block

●Normal interlocking block

shot-blasting
polished

●Rough surface texture

●Resin finish

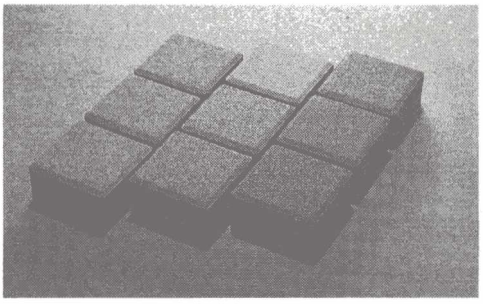
●Crushed stone finish

●Tile block, stone block

●Permeable block, completely permeable, partially permeable

●Recycled block

Each block has dentated type, straight type, hexagonal type and other shapes together with color variations.



Block with resin mixed

8.POLISHED-UP SITES OF INTERLOCKING BLOCK

There are recently a lot of polished-up sites where interlocking block is designed totally. When interlocking block plays a supporting role instead of the leading role, the sites are apt to be evaluated as polished ones. That is because the road managers and designers mind not only roads but the nearby buildings and surrounding environment for the entire roadscape. As a result, elegant sites are constructed. The reason why there are many good sites of interlocking block recently is that contractors and designers have been polished up and that designing has been enhanced aided by computer.

It is possible to visualize the basic coloration by simulating photos of the site and laying patterns of interlocking block on CG. They can check coloration and patterns beforehand without test-laying and more efficiencies of work and a consensus of landscape images can be achieved. This kind of technological advances is another reason for better sites of interlocking block pavement.

9.INTRODUCTION OF PRESENTING PAVEMENT DESIGN

CG is widely used for designing interlocking block pavement and more efficiencies and

accuracy are requested. There are such techniques of CG like expressing in plane, expressing perspectively and montaging photos and the images after finish are expressed easily. Utilizing CG should be in principle done by designers but in general it is done by manufacturers of interlocking block as service.



CG by 3-D CD(photos by Maeda Seikan)

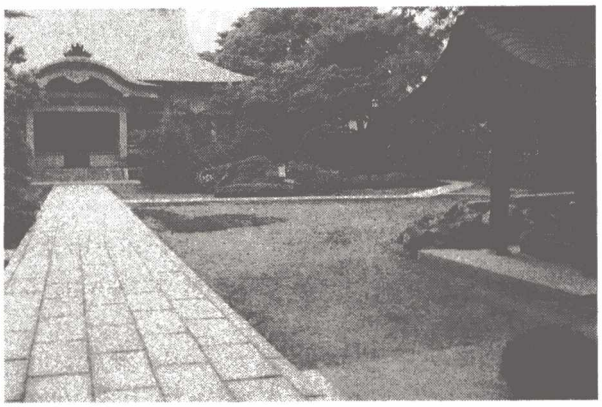


Photo of a planned site



Montaged image

10.COLOR OF PERMEABLE BLOCK

Permeable block is a block with voids made by hardening crushed stone with a special binder so that it permeates rainwater while maintaining strength. There are two types of permeable block, one is permeable pavement type through which rainwater permeates directly into underground and the other is drainage pavement type through which rainwater is drained into side ditches through the underneath of the block where the impermeable layer is provided. Those two types are used depending on the road conditions but drainage pavement is generally used for roadways and permeable pavement for parks and walkways where traffic is a little.



Low-noise permeable pavement in Hiroshima Yokokawa Shopping Street



Details of permeable block in Yokogawa Shopping Stree

The voids of porous permeable block show shadow giving depth in appearance and it looks more stable pavement with less diffused reflection than normal interlocking block creating excellent roadscape. The photos below are colors developed for low-noise drainage pavement for roadways and they look more chic than colors of normal interlocking block by the influence of shadow made by voids.

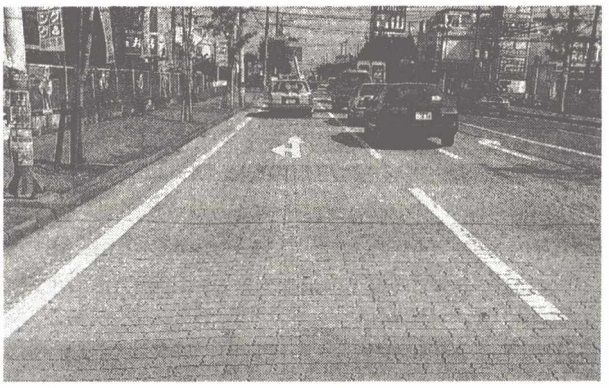
11.SECULAR CHANGE AND INTERLOCKING BLOCK

Natural stone pavement is accepted for roadscape with its emotional attraction even after wearing by pedestrians walking thereon and vehicles travelling thereon. But interlocking block which is concrete shows the best appearance of the material at the time of construction and it gets poorer and poorer as time passes than the time of construction. This may be fate of concrete but it could be improved according to how to maintain interlocking block. Shopping streets that often clean the interlocking block pavement can limit the impression of landscape-degrading. But interlocking block pavement under girder bridges which do not get wet from rain and no body cleans is covered with dust and quite dirty from landscape point of view. Interlocking block pavement where they clean can stand well after 10 years without damaging landscape thus the importance of maintenance should be stressed.

A roadway of interlocking block in Hamamatsu and Ichihara City still bearing heavy traffic has been in service for 18 years without renewing. It has been confirmed that roads with the robust base like this site can live long causing little unevenness and chipping of block and the cost comparison with asphalt should be made taking the total aspects into consideration



Hmamatsu City 18years after



Ichihara City 18years after

12.HARMONY OF INTERLOCKING BLOCK WITH URBAN LANDSCAPE

In the streets of European cities, the relations between streets and buildings have been held as one whole set. The recognition that the streets are space-wise integrated is accepted and space of the roadscape harmonizing with buildings is created.

Many Japanese cities rebuilt after the War are rather disorderly from landscape point of view and it is difficult to see them as a whole set of streets and space because shapes and colors of the facades of buildings are chaotic and have no totality. But street views retaining old Japanese houses in Kyoto or Kiso show integrated local culture and are easy to recognize as a total set. Therefore, in those places, it is easier to plan better pavement but in urban areas with chaotic landscape, designing should be carefully carried out imaging the future landscape.

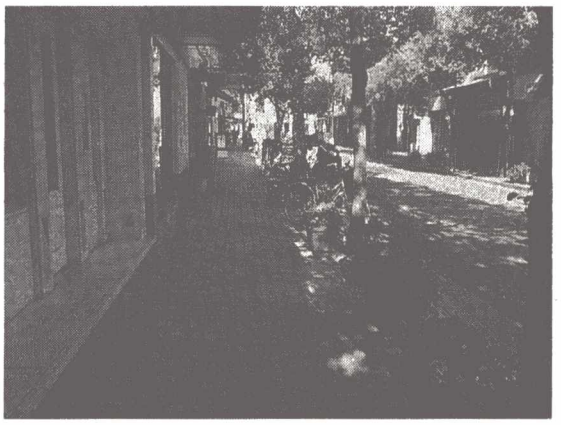
Here an example is shown where street landscape changed beautifully by paving interlocking block. The Miyamae-dori shopping street in Hiroshima-ken underwent frequent and heated discussions in order to determine colors of interlocking block to be paved for the walkways which had been asphalt. 3 different gray shades were selected at last for the colors were to set off shoppers and shops which are important to the shopping street. Since then, they have succeeded in gaining good sensible tenants and

enhancing the entire street. It may not too much to say that the creation of a good community originates from interlocking block but it is most important to have

integrated images.



The Miyamae-dori shopping stret
before paving interloking block

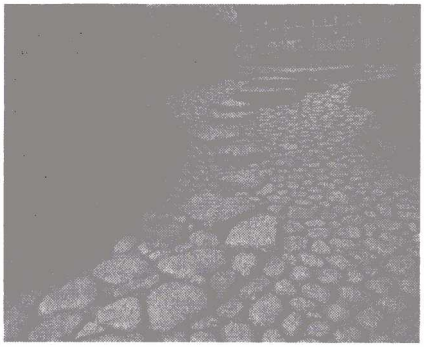


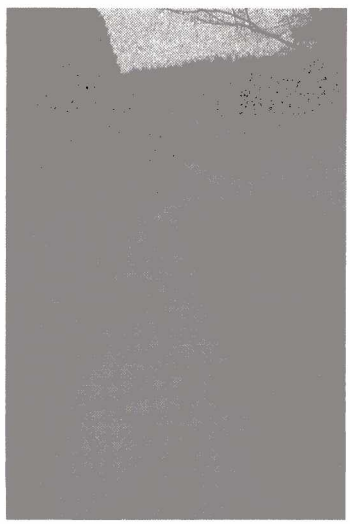
paving interloking block 15years after

13.PRODUCTION TECHNIQUE OF PARKWAYS LEARNED FROM JAPANESE GARDENS

Beautiful stone-laying patterns of parkways in Japanese gardens like Katusra Rikyu are traditionally seen. The rhythm of the secrets never making strollers get tired of walking is comfortable. The parkways have a drama and the stone-laid parkways are playing an important role within the sequence. The parkways are not just a pavement but are in assimilation in space with the surrounding landscape also produced in a time series. The author of a famous novel "The Streets for Mankind", Barnard Rudolvsky who once stayed in Japan states in his work "Kimono Mind", "There are no linear alleys in Japanese gardens. The step stones are arranged according to the rule which is nothing but the secrets. It is to make walking an aesthetic adventure." There is originally a technique of a landscape garden in the go-round style in Japan and it has for a long time regaled the strollers with their turning viewpoints and the sequence. But such designing ideas are not unfortunately reflected on the present streets of urban cities in many cases. Although the old famous gardens were built for special people and have different characteristics from the present streets, the designing idea from the viewpoint of attaching importance to the users should be reflected on planning public streets. As seen in many famous gardens of Japan, Japanese have a sense to assimilate and combine nature with artificial structures and it is necessary to recognize and draw out such latent faculties in the future.

The parkways in famous gardens are not intended for pavement only but it is an important factor creating entire space of garden. They are related deeply with other factors and creating the entire beauty. But unfortunately, the designing idea as Japanese culture which is supposed to be continuous in Japan has receded and become narrow-sighted under the severe economic situation casting a gloom on the future formation of urban landscape. There are lot of cases where they only carry out fractionized works without sections managing space structure and landscape images and they ended up with designing within a limited range. The point is where to put or to be able to put the standard of the judgement of a general value and the priority. The degree of culture of cities will be from now on judged by the system and intention of creating those total urban environments.







14.THE PROGRESS AND FUTURE OF INTERLOCKING BLOCK

There still be problems of interlocking block to be solved such as walking comfort, riding quality and tactile blocks(barrier-free) but the progress in design of interlocking block in Japan has reached a high level during last 20 years. But how to totally coordinate it in the future with landscape is very important.

They should not stick only to the pavement surface of interlocking block but they should give considerations to surrounding environment and future images of the site and by doing so, they can have clear positioning of interlocking block and create better external space so that the applications of interlocking block will expand.

Interlocking block can start creating a community. Not just selling a mass of concrete as a commercial product but aiming at the creation of better roads and space will eventually expand the market and gain a social status.