URBAN CONCRETE BLOCK PAVING IN THE NETHERLANDS AND WHAT ABOUT 'CREATIVE DESIGN ?

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SUMMARY

In the Netherlands the manufacture of concrete paving blocks started in the very early 1950s. In the 1970s and 1980s the per-capita use was around 1 m^2. In 1990 the production exceeded 18, if not 20 million m^2, which equals 1.2 to 1.3 m^2 per head of population.
Over the past four decades many foreigners have visited the Netherlands to study the use of CBP. However, there never was any publication on the wide range of Dutch applications of CBP. This paper intends to compensate for that omission by giving a survey of a few but representative examples of urban applications of CBP in the Netherlands.
The paper first examines the reasons why CBP has become a highly accepted paving system. The then presented examples are all applications in urban areas where the aesthetic qualities of CBP could fully be used. Therefore the crucial question: What about 'creative design?', with which the architectural application of CBP is meant. For improving the urban environment an 'interprofessional co-operation' seems to be the prerequisite. This means that for CBP in urban areas the structural designer, traditionally an engineer, should work in close collaboration with an architect, if not with a landscape architect. However, it's remarkable that Dutch architectural applications have also been designed by civil engineers and sometimes by visual artists. Moreover, for some projects the choice of CBP has been made to meeting the 'vox populi' of e.g. residents or shopkeepers.

1. INTRODUCTION

In the Netherlands there was a long standing tradition of brick paving which may have been due to both the absence of natural stone-setts (rocks) and the abundance of natural clay sources (river clay). However, after World War II there has been a shortage of traditional bricks for paving since they were used for rebuilding and later for new building. Therefore, in 1951/1952 concrete paving blocks were introduced [1], As explained by Kellersmann [2], they have never been regarded as a new phenomenon since they were in fact a substitute for paving bricks. However, concrete paving blocks offered a cheaper alternative, which also proved to have a better structural performance than clay pavers, mainly due to the greater uniformity of the horizontal dimensions.
From the early 1950's onwards, particularly within the first twenty years, there was a substantial growth in the Dutch block paving market. In the 1970s and 1980s the annual production ranged from 12 to 17 million m^2, which equals about 1 m^2 per head of population. In 1990 the production exceeded 18, if not 20 million m^2, equal to 1.2 or 1.3 m^2 per capita.
The very rapid growth in the use of CBP has been obtained on a very wide range of applications: from the rather simple domestic pavements to the much more complicated, industrial pavements. All these applications were possible thank to the enormous versatility of concrete paving blocks, there is no doubt of it. Therefore, first the mentioned versatility will be presented by examining the reasons why CBP has become a highly accepted paving system.

2. THE VERSATILITY OF CBP

Since the top layer of any CBP consists of 'removable, small-sized elements made of concrete', all qualities, possibilities and advantages of that layer originate from the mentioned three characteristics: 'Removable', 'Small-sized' and 'Made of concrete' [3, 4].

2.1 ’Removable’

In CBP, like in any other form of segmental paving, the paving units can always easily be lifted without damaging them so that they can be re-used on the same site or elsewhere. This certainly is an important advantage for local or full-scale repairs. The paving units being lifted, the base level is corrected and then the units are relaid, and damaged units, if any, are replaced. The same working method can be used in case of local settlements, which could be expected in a main part of the Netherlands.

Moreover, changes in underground services (cables, pipes and drains) can readily be accomodated. Finally, in residential, commercial and industrial developments temporary pavements can be provided, particularly for construction traffic. In Dutch practice the units are then laid ’upside down’, often in parquet pattern, and the development being completed the units are laid in their final position and pattern.

2.2 ’Small-sized’

The paving units of CBP, like those of other forms of segmental paving, are small-sized and that’s why they can be mass-produced in modem, specialized plants with favourable conditions for process control and quality inspection. Due to their small size and limited weight the units can be placed or laid manually either with the traditional craft method, still very popular in the Netherlands, or with the ’lay-down’ method. However, mechanical laying has been introduced and this technique will be used ever more, at least in the Netherlands, first for ergonomic reasons [5.. 7J. The small-sized units can be placed or laid in different patterns, e.g. herringbone and stretcher bond, for both functional and architectural reasons. Moreover, they can also be used to pave small or irregular areas, as well as for channels, on slopes, etc.

2.3 ’Made of concrete’

Concrete paving blocks are unique segmental paving units due to the simple fact that they are made of concrete: a world-wide known building material with its own technology, and the raw materials are widely available. In the Netherlands these blocks are produced and used from the veiy early 1950s, and ever since a broad experience has been gained with both their manufacture and their application. Since 1966 there is a Dutch national standard for concrete paving blocks [8] and in 1967 a certification scheme has been introduced [9]. Certified concrete paving blocks are strong, durable, skid and wear resistant, and dimensionally accurate.

The blocks being made of concrete, there is in fact a great variety of shapes and sizes. In the Netherlands, however, the most common shape is a rectangle with a plan size of around 200 mm x 100 mm which is generally used when the structural capacity is the prime design requirement. Other block sizes (e.g. 200 mm x 70 mm, 200 mm x 50 mm, 200 mm x 200 mm and 100 mm x 100 mm) and non-rectangular (shaped) blocks are becoming ever more popular for applications where the aesthetics and functionality are predominant as in town- and street scaping. Moreover, different surface textures can be created, and last but not least the blocks provide a large variety of colours, both uniform and blended.

With a few catchwords the foregoing is summarized in the next table:

shapes	formats	colours and textures
laying patterns	weight	removable!
strength	durability	dimensional accuracy

This table demonstrates the enormous versatility of concrete paving blocks which explains why CBP has become a highly accepted paving system on a very wide range of applications.

3. ARCHITECTURAL APPLICATIONS

According to Shackel <10> a distinction can be made "between architectural applications where the structural capacity of the pavement is usually not a major consideration and engineering applications when the ability to resist both static and traffic loads is the prime design requirement".

As a matter of course the former applications offer the best opportunities for 'creative design' or 'architectural creativity'. In each country architecture on the whole certainly is a reflection of the national character. That's why the traditional architecture in the Netherlands, unlike to that in some other countries, never was 'overdecorated', 'frivolous' or 'exuberant'. The underlying 'frugality* or 'economy' has also determined the 'horizontal architecture', i.e. the appearance of the pavements in urban areas which generally is simple and sober.
From the first use of CBP nothing changed in spite of the new possibilities offered by the blocks. However, afterwards and particularly from the 1970s in street- and town scaping more use has been made of the still growing variety of colours, shapes, formats and surface textures of concrete paving blocks, which can be laid in different patterns. This cannot be detached from recent developments in the Dutch architecture, which now is more than in the past characterized by the use of colours and other architectural 'design instruments'.

Creative design, as mentioned in this paper, can be found in domestic CBP around homes. The projects are relatively small, it's true, but with their still increasing number they are a growing part of the total paving block market. According to Lilley <11> and others the blocks can be laid by inexperienced householders (do-it-yourself jobs). However, the capability of untrained labour should never be overestimated! Photograph 1 shows a garage drive laid along the home of a professional pavior who laid a decorative CBP according to his own creative design. The covered terrace in the author's back garden with black and white blocks (photograph 2) was paved by a skilled pavior too.

The building complex of the Agricultural and Horticultural School in Houten, near Utrecht, is surrounded by gardens where the students can become familiar with a wide variety of plants, bushes and trees. The landscape architects Van Gils and Thijsen have applied a lot of paving blocks in different shapes, formats, colours and patterns, which will make the students also familiar with the use of CBP in modem gardening. An example of their footpaths is illustrated in photograph 3.

The landscape architects Krant and Bijlsma have applied around 20,000 m^2 CBP for the Regional Hospital Almelo in the eastern part of the country. Their creative design includes roads, paths, patios and terraces, also on behalf of ambulant patients. The main part of the blocks, however, is used for the parking area with a capacity of 1,000 cars. Photograph 4 illustrates how coloured blocks are used to identify the bays and to guide the people to the main entrance. Moreover, the appearance of the CBP is highly appreciated by the patients looking down from the floors of the adjacent hospital building.

CBP is extensively used in the city of Rotterdam <6, 12>. As it can be expected in world's largest port, the structural and functional considerations often are predominant and that's why most applications are first of ail engineering ones. Recently, however, typically architectural applications have been realized not in the least thanks to the creativity of the Public Works Dept, of Rotterdam.
In May 1990, 45 years after World War II, a national monument for all civilian victims of the mentioned war was inaugurated in the Rotterdam disctrict 'Kralingen'. Photograph 5 shows this monument, named 'The Stone of the Million Tears', surrounded by radial CBP.
The new Rotterdam district 'Brainpark' accomodates the offices of several high-tech companies. For the centre of this district the artist Kees Verschuren designed an imposing concrete sculpture and the Public Works Dept, designed a matching CBP as is seen in photograph 6.

In the Netherlands, with its long-standing tradition of brick paving and more recently of block paving, the craft method of constructing segmental paving can be trained during a five-year apprenticeship. Since 1982 every year a national competition is held where two-man teams of advanced apprentices each have to construct a decorative CBP. Photograph 7 shows the then almost completed pavements made in 1990 on a waterfront in Rotterdam which city then commemorates its 650th anniversary.

The outlines of the building complex of the ’Limagas’ company in Landgraaf, in the most southern part of the country, are parallel with the diagonals of the square site. Landscape architect Snelder continued these diagonals when he designing the surrounding pavements. An example of his creative applications of CBP is seen in photograph 8.

That modem CBP can be harmoniously used in old and historic environments is very well demonstrated in the centre of the city of Amsterdam with its highly commended ring of canals. CBP has been introduced here by the Public Works Dept, of Amsterdam, which already had a good experience of several years with CBP in the outskirt and the new urban developments of the country’s capital <2>. Photograph 9 shows some details of CBP along the canal ’Keizersgracht’ with its seventeenth-century houses. Photograph 10 illustrates how modern CBP can fully harmonize with the old brick facades of former warehouses along the ’Entrepotdok’ which now accomodate modem apartments.

At a distance of hardly 25 km from Amsterdam the entirely new city Almere is built ’at the bottom of the sea’ (4 to 6 m below sea level!), viz. in the new land of ’Southern Flevoland’, reclamation of which began in 1968. Here the most recent Dutch ideas concerning town and street, dwellings and living are being put into practice. On the occasion of the housing exhibition ’BouwRAI 1990’ held in Amsterdam, the Almere district ’Domusica’ (district of the music) has been designed as an example of ’Living in the 1990s’. Prominent Dutch architects were invited to concretize their views and the Public Works Dept, of Almere created the matching CBP’s as is seen in photograph 11 which shows the main entrance of the new district. Both functional and architectural are the well-detailed and well-constructed parking bays with their modest markings as is illustrated in photograph 12.

The ’Apollolaan’ is a 60 m wide avenue in the Amsterdam disctrict ’Zuid’ dating back to the early 1930s. With the increase in traffic, particularly from the 1960s, the original brick paving became questionable and required more and more maintenance. That’s why the Public Works Dept decided to replace the bricks by an asphalt pavement. However, the residents advocated to retain the original character of the avenue. This was supported by others and finally accepted by the authorities. The upgrading of the ’Apollolaan’, from the end of the 1980s, has been realized with a large-scale application of concrete segmental paving: flags, kerbs and over 150,000 m^2 paving blocks (photographs 13 and 14). The blocks have a remarkable brown/purple colour, matching the original character of the avenue and selected in consultation with the residents.

For the annual two-week ’National Tattoo’ a new location has been found in the forecourt of the ’Chassd’ barracks (1899) in Breda. Therefore, the engineers of the Ministry of Defence designed a CBP with different block colours and laying patterns to create rectangles and lines for guiding the marching participants (photograph 15). During the remaining other weeks the central part of the forecourt is used as parade-ground and the side lanes are used for car parking.

Oostburg (18,000 inh.), a busy regional and touristic centre in the most southwestern part of the country (province Zeeland), is still crossed by a national main road (10,000 vehicles/day), which divides the shopping centre into two parts. The Public Works Dept, of Oostburg intending to renew the underground infrastructure and to upgrade the streets and squares presented a paving scheme which, however, has been rejected by the Shopkeepers’ Association ’Oostburg Promotion’. That active Association, asking for a both identifying and unifying street scaping, contacted Gijs Bakker, originally a gold- and silver smith but in the meantime a reputed industrial designer with already some practical experience in street scaping. Being invited by the Association, first for the street furniture only but soon for the complete centre scaping, he created one of the finest Dutch examples of the architectural application of CBP which was realized by a highly recommendable ’interprofessional co-operation’ of authorities, residents, the contractor and an artist. Furthermore, the Association’s members were willing to pay DF1. 500,000, a veiy important share in the costs of upgrading their residence’s centre (photographs 16 and 17).

For the rather old centre of Nijkerk, midst in the country, the Public Works Dept, introduced darkbrown paving blocks to be used in combination with the existing, traditional paving bricks and stone-setts. In the meantime blocks with the mentioned colour, obtained by using darkbrown aggregates, and also with other colours have extensively been used in new urban developments, e.g. for a children's playground as is seen in photograph 18.

Arnhem's newest city expansion 'Rijkerswoerd' with around 5,000 dwellings, construction of which began in 1987, will be completed early next age. As already being demonstrated by its first part, this new district will be in several respects a fine example of the actual Dutch land-, town- and street scaping. In their creative design the architects and other experts of the city of Arnhem were highly assisted and inspired by Wim Korvinus, an out-and-out artist invited for selecting the colours not al least those of the segmental paving. The 'Urban Route', throughout the whole development and already more than one kilometre long, is paved with yellow and black blocks as is seen in photograph 19. Photograph 20 illustrates how blocks are used near an inlet for the surface water drainage.

The basement of the new Motel 'Tiel', west of Arnhem, accomodates facilities for exhibitions etc. and therefore indoor applications of CBP have been realized. Photograph 21 shows the exhibition room (1,800 m^2) which is bordered by a restaurant and meeting room (700 m^2) as is seen in photograph 22.

In the 1980's the brick paving of an inter-urban road several kilometres long, southeast of 's-Hertogenbosch, has been replaced by CBP. The maximum speed within the built-up areas is 50 km/h but between them 80 km/h as is seen in photograph 23. Recently at some road junctions an attractive roundabout was installed and the Roads Dept, of the province Noord-Brabant used again concrete paving blocks, now for the complete roundabouts as is illustrated in photograph 24.

In the new developments of Zwolle, the capital of the Province Overijssel, concrete paving blocks have extensively been used by the city architects and engineers who prefer a limitation of colours, shapes and formats. Nevertheless, the CBP's they designed are both functional and architectural as is illustrated in photograph 25 which shows a combined shopping and residential street. Photograph 26 is an example of a well-designed and well-constructed detail, including a drive-over kerb.

In Rosmalen, the author's residence near 's-Hertogenbosch, the CBP's in the newest extension are provided with a centre-line drainage as shown in photograph 27. This provision is not only an economical but also a functional one since it reduces the speed of the traffic.

In the streets and squares of the still rapid growing town of Houten, near Utrecht, there is an extended use of concrete paving blocks which as a rule are in fact uncoloured according to the view of the well-known landscape architect Kalff that the use of different colours does mar the multi-functionality of urban pavements (walking, playing, driving, parking, etc.). Nevertheless, the streets and small squares he designed for the new developments of Houten are not monotonous, certainly not, seeing particularly the use of different laying patterns. For a few years he created one of the most remarkable new squares in the Netherlands: the 'Het Rond' Square in the real heart of Houten. Here the pavement mainly consists of concrete blocks with a red colour obtained by using red aggregates. For improving the functionality and at the same time the appearance blocks with two other colours (yellow and black) have been used as is illustrated in photographs 28 and 29.

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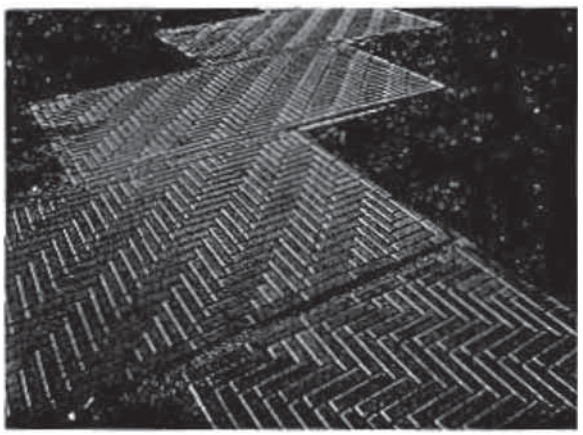
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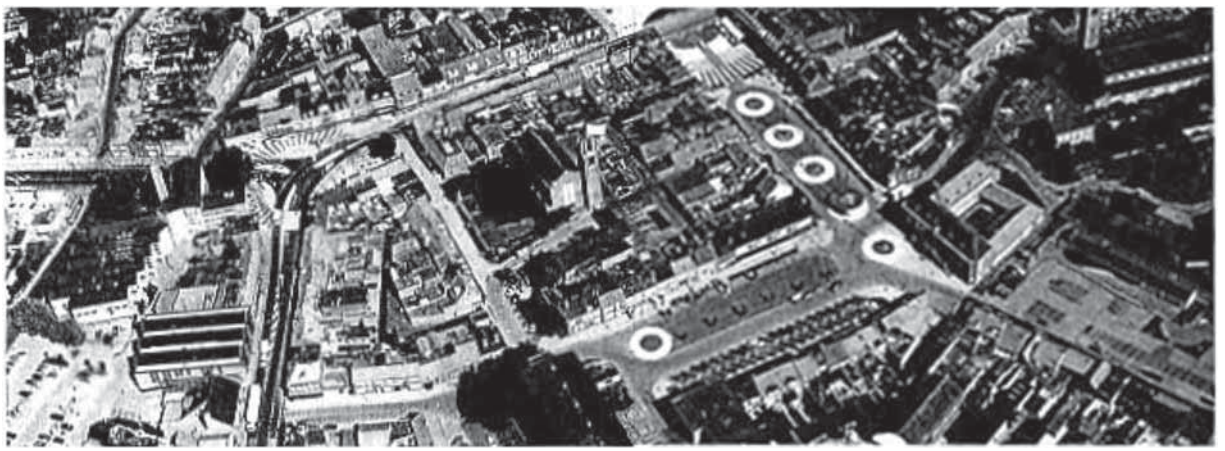


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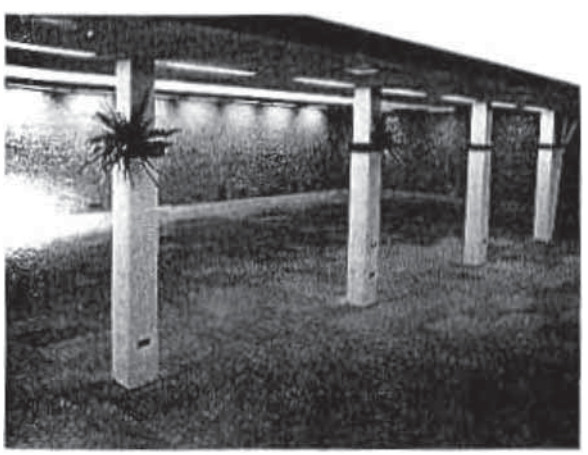


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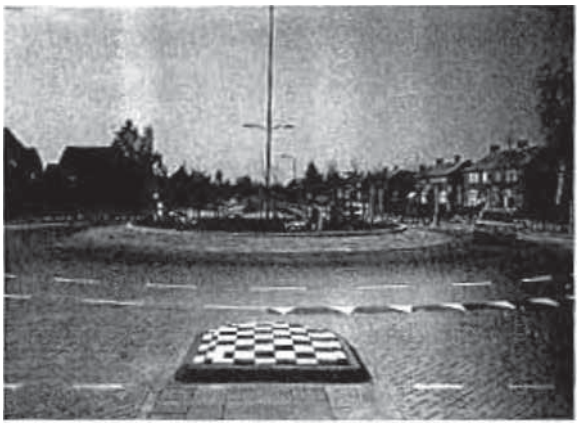
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