CONCRETE BLOCK PAVING IN INDONESIA

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SYNOPSIS

Concrete Block Paving was introduced in Indonesia in 1977 through the sidewalk of Jakarta's main boulevard, Jalan Thamrin. Initial production problems were concerned with mix design, how smooth the block surface should be, sizes, shapes and strength. The C&CA film on 'Concrete Block Paving' was a good guide in many ways, especially on the method of how to lay Concrete Block Paving.
After five years, there exist more than 500,000 sq.meters of Concrete Block Paving in Indonesia. Successful projects include a few bus terminals (resistance of Concrete Block Paving to oil spillage), residential roads which serve as construction roads, and factory pavements. In 1984, at least one container terminal in Indonesia will use Concrete Block Paving. Ease of repairability, excellent resistance to static loading and high dynamic load were mentioned as reasons why Concrete Block Paving were chosen.

1. INTRODUCTION

Late in 1977, the writer's company purchased a copy of the film made by Concrete and Cement Association, U.K., titled "Concrete Block Paving". The company had in its possession a mould of UNI-shape paving block for its Columbia concrete hollow block making machine. Towards the end of 1977, Jakarta's Municipal Government was in the mid of a crash program to upgrade and beautify Jakarta's main boulevard, Jalan Thamrin.
The writer felt that there was an opportunity to introduce Concrete Block Paving to the beautification program. So a presentation using various overseas slides and the above-mentioned C&CA film was made to an impressive group of various Departments' heads and staff of Jakarta's Municipal Government. The result was immediate: the writer's company was awarded with the order of concrete block paving, (hence given the name 'INTERBLOC') for Jalan Thamrin's 8,000 sq.meter sidewalk.
In February 1978 when the whole installation was completed, every one involved with the project was pleased. Indeed, there could not have been a more strategic place to introduce a new product than along Jalan Thamrin in Jakarta.

2. INITIAL PRODUCTION PROBLEMS

- How do you make Concrete Block Paving on Columbia Hollow Block Machine?
- What mix design?
- What surface smoothness or texture?

To make things difficult we had never had or seen a 'proper' Concrete Block Paving before. The Concrete and Cement Association film therefore became the 'Standard'. How do you get such a 'smooth' surface? It took us years, many troubles, and many unhappy complaints from our customers to finally arrive at a surface similar to the Dutch blocks. Even this could only be achieved in a proper German-made machine for making Concrete Block Paving.
In 1978, the writer toured some companies in Denver, Colorado, USA and New Zealand, all were using Columbia hollow-block machines to produce their Concrete Block Paving. The surface of Concrete Block Paving obtained was poor. But, they were pleased; of course, until someone else offerred a better product.

3. SIZE AND SHAPE

The very first Concrete Block Paving mould we bought was from Columbia machine. We were given a very small UNI-shape: 55 stones in every sq.meter. This is the shape and size with which we introduced Concrete Block Paving in Indonesia. Later, we found, to our disappointment, that our machine could, in fact, make the same number of Concrete Block Paving with a bigger stone: 46 in every sq.meter. So we re-introduced this shape. After a number of trips to Europe, and learning particularly from the Dutch and Germans, 3 years ago we finally dropped the old size, and brought out the proper UNI, 39 stones in every sq.meter. Now, apart from UNI, in Indonesia there are 5-6 other shapes such as UNI-decor, Zurich, Holland - stone, etc.

4. STANDARD FOR STRENGTH

It was sometime in December 1977, during a visit to Jakarta by a group of engineers from Amsterdam's Public Works Department, that the author met with Ir. G.H. Kellersmann. The question of strength, was one the topics discussed. Eventually it was temporarily decided that a characteristic strength of 300 kg/sq.cm. for Concrete Block Paving should be tried out first. After a

number of years, then we should evaluate whether a higher strength is needed.
Presently, a strength of 300 kg/sq.cm. is universally used in indonesia for everything except very heavily-trafficked areas, where a standard of 450 kg/sq.cm. is applied.

5. INSTALLATION OF CONCRETE BLOCK PAVING

Thanks to the Concrete and Cement Association film on Concrete Block Paving, right from the very beginning we have been able to impose the C&CA method of laying Concrete Block Paving. For us, it is a method which we have put into actual practice, and has been working well. In fact, the C&CA film has been shown on almost every new or major job for training purposes.

6. DESIGN

In the late seventies very little literature was available on design methods. Despite Knapton's early research on the equivalency of Concrete Block Paving and asphalt in terms of load-spreading ability, very few Indonesian engineers bought the idea. In most cases Concrete Block Paving was regarded only as a surface course, substituting the asphalt layer. Thus the subbase and base course would remain of the same thickness. This attitude resulted in overdesign, and made Concrete Block Paving much more expensive than asphalt pavement.
Thanks partly to the papers presented at the First International Conference on Concrete Block Paving in 1980, now road designs using Concrete Block Paving have been more and more economical and competitive than asphalt pavement. Of course, having had 500,000 sq.meter of pavement in and around Jakarta since a few years certainly helps to influence many Indonesian road engineers favourably towards Concrete Block Paving.

7. JAKARTA PUBLIC WORKS DEPARTMENT

One of the biggest barriers that still exists is the fact that Jakarta's Public Works Department has not formally accepted the (Interbloc) Concrete Block Paving road as an viable alternative to asphalt. Various efforts have been done to overcome to problem: Ir. G.H. Kellersmann has played a very important role in introducing and familiarizing Jakarta's Public Works officials and to some degree, Jakarta's Municipal Government, on the viability of Concrete Block Paving for roads. Despite the fact that there already exist more than 500,000 sq.meter of Concrete Block Pavement in and around Jakarta, the Public Works Department has not formally accepted Interbloc because the officials feel that there exist no proper design method that can be adopted for Jakarta's conditions. The writer sincerely hopes that this conference will throw some light into solving the problem.

8. DIFFICULTY FREIGHT COST - DISTANCE COVERED

Concrete Block Paving can compete quite economically if a project is within a 100 kilometer radius. However, if there are projects outside the island of Java or 1,000 kilometer out of Jakarta, then the freight cost becomes prohibitively expensive. A mobile but automatic machine making Concrete Block Paving complete with a proper batching plant with a daily capacity of 300-500 sq.meter should be developed to meet such demand. Afterall, the economy of using Concrete Block Paving is becoming quite obvious now to many Indonesian engineers, if it were not for the freight cost.

9. SIDEWALK

The choice of Concrete Block Paving -- Red UNI-shape -- for the sidewalk of Jakarta's main boulevard was more for aesthetical reason than anything else. However, after six years, the pavement still stands out well.

10. CONSTRUCTION ROAD IN REAL ESTATE

The concept of temporary or construction road is prevalent among Indonesian engineers. A temporary or construction road is built at the beginning of a typical housing project. This road will accommodate the construction traffic during the construction period. Later, after the buildings have been completed, a proper road with a asphalt-concrete layer is built on top of the partially-damaged construction road.
When properly designed and constructed, a Concrete Block Paving road can be built first at the beginning of a housing project, and later serving as construction road. After all the houses have been built, the road would still remain in a good condition, with only minor or insignificant surface damage.
Thus born a concept that construction road with Concrete Block Paving can be a permanent road to be built firstly. Besides, Concrete Block Paving does create an environment which is more human, friendly and aesthetical. These features appeal strongly to the Real Estate Developers.
It may interest the readers to know that the more luxurious Real Estates in Indonesia do not sell ready-made houses. They build infra-structural facilities such as roads, sidewalks and the rest. When an attractive living environment is created by the roads, and other facilities, then they will sell only the subdivisions. Potential buyers do like the Concrete Block Paving roads. Hence, Concrete Block Paving gives a



Figure 1: During construction period



Figure 2: After construction period

distinct 'value added' to Real Estate. The photograph above shows the Concrete Block Paving road in 1978 being used by construction traffic to build 300 houses. The second photograph shows the road in April 1983 after dwellers have occupied their houses for 5 years. There has been no maintenance required on the pavement during the 5 years' period. Very few asphalt roads in Indonesia can claim such a record of performance.

11. BUS TERMINAL

Thanks to the technical advice by some of the author's Dutch friends, especially Ir. G.H. Kellersmann, in 1978 a Municipal Council bus terminal was built in Jakarta using Concrete Block Paving.
Concrete Block Paving does solve one of the biggest headaches in any asphalt-paved bus terminal, namely 'oil spillage'. Jakarta's City Traffic engineers could not have been more pleased with Concrete Block Paving. Since 1978, we have supplied Concrete Block Paving to 5 other new bus terminals.

12. CONTAINER PAVEMENT

Belawan in North Sumatera is to have a container port in 1984. The pavement has been designed to use a rectangular-shape 100 mm thick Concrete Block Paving designed by an Anglo-Australian engineering consultant. When meeting the consultant, the writer was informed that differential settlement was expected to occur on the newly reclaimed land where the pavement sits. The choice of Concrete Block Paving will give the Port Authority much ease of repairability of the pavement, should settlement occurs in the future. Static loading and high dynamic load were other reasons for choosing Concrete Block Paving.

13. FACTORY PAVEMENT

There has been relatively few successes of Concrete Block Paving used for factory pavement. However, in this paper-making factory in the outskirt of Jakarta, the factory management had many problems in maintaining the asphalt road around the factory. High ground water, very heavy loads by forklift trucks and lorries, were some of the reasons. Two years ago, Concrete Block Paving was tried.

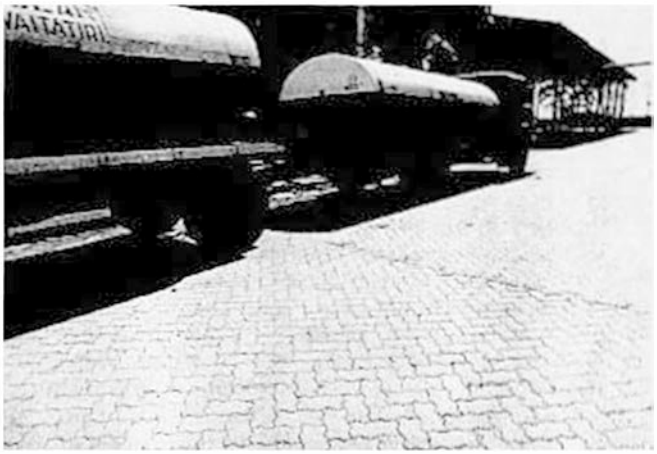


Figure 3: Kertas Bekasi Teguh Factory

Now, the whole asphalt pavement has been replaced by Concrete Block Paving. The management of the paper-making factory, and its group of companies are completely sold on Concrete Block Paving concept. Durability, ease of repair and little or no maintenance, were cited as some of the reasons.