Inorganic Pigments

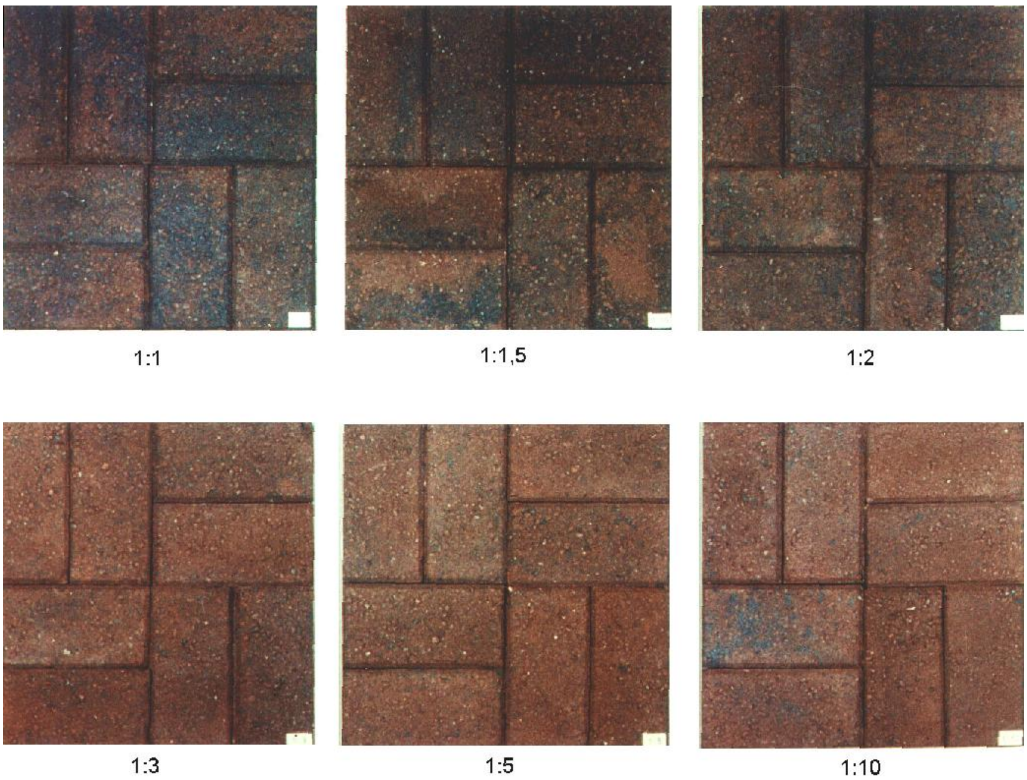
Technical Information
Competence Center Construction

Edition: January 1999
Replaces edition: 08/93

The Production of Multi-coloured Concrete Paving Blocks

The production of multi-coloured concrete blocks, concrete paving blocks and paving slabs is in principle the same. The manufacturing methods described here are based on the use of two or more differently pigmented concrete mixes, whose composition, i.e. cement content of the concrete mix, water/cement ratio, grading curve of the aggregate etc., are the same. The concrete mixes are prepared in the usual way. To achieve the two-colour or multi-colour effect, it is important that differently coloured concrete mixes are not completely mixed with one another when they are processed.

Depending on the proportions, in which the two or more coloured concrete batches are mixed, the emphasis can be placed more on one or other of the colours. Picture 1 shows the colour effects achieved on two-coloured red and black concrete paving blocks:



Picture 1

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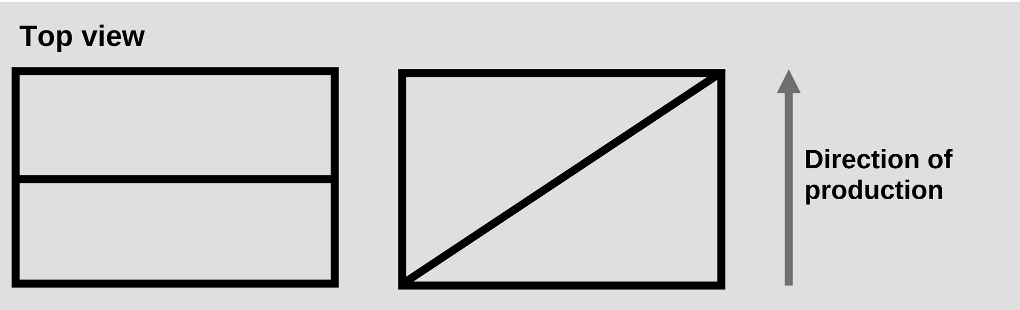
The proportion of black to red concrete was varied between 1 : 1 and 1 : 10. The pigment concentration of the black concrete was 5 % with Bayferrox® 318, while the red concrete contained 5 % Bayferrox® 130. The pigment concentration will depend on the desired shade and can range between the 2 and 5 % (calculated on weight of cement) generally adopted in practice.

The production of multi coloured concrete paving blocks, paving slabs etc. in practice depends on the available machinery. A number of different processes can be employed some which are described below, taking as an example the production of two-coloured concrete paving blocks:

Process 1

The filling hopper on the concrete paving block machine is divided into two ore more sections; the dividing wall should end at least 5 cm above the hopper outlet in order to make it easy for the mixes to run into another in the hopper. When using two pigmented concrete mixes the following division has proved advantageous:



The two coloured concrete mixes are each filled into one of the halves of the hopper. The disadvantage of this method is that, at the beginning of the production, only blocks from the coloured concrete mix poured in first can be made. This irregularity in shade can, in fact, sometimes be desirable to break up the colour of a large coloured area. During the course of production, care must be taken to ensure that the hoppers are always full in order to avoid single-coloured blocks.

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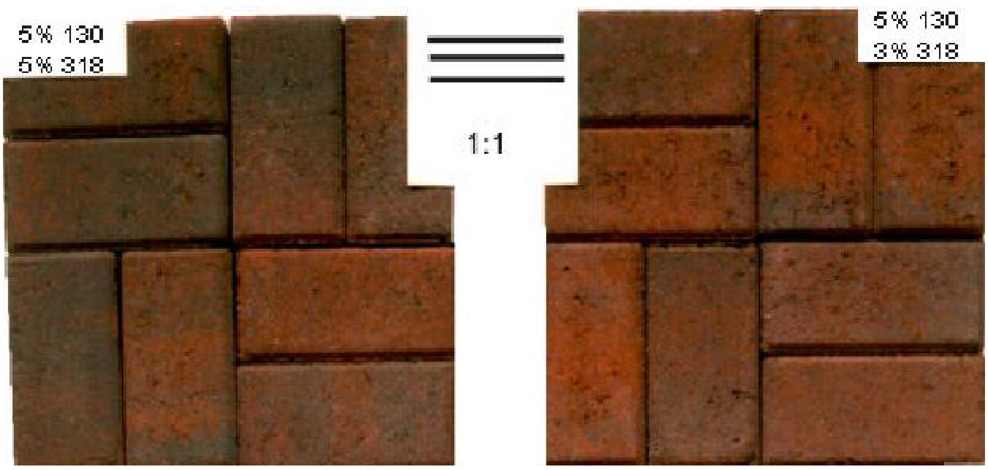
Process 2

Two or more differently coloured concrete mixes are placed, in layers, into the filling hopper of the machine in such a way as to form, as far as possible, horizontal layers one above the other. When the mix is drawn off, the material nearest to the centre of the hopper slips down the fastest, resulting in incomplete mixing of the various batches. It is important to carefully co-ordinate the water/cement ratio to the geometric dimensions of the hopper to ensure an optimum flow of the material.

Picture 2 shows multi-coloured paving blocks produced according to the procedures described under point 1 and 2. For the production of the paving blocks shown in the upper half of the picture, the concrete mixes (red and black coloured) were filled into the hopper in layers. The blocks shown in the lower part exemplify the division of the filling hopper into two chambers. The red/black concrete ratio was 1 : 1, i.e. equal amounts of red and black coloured concrete were filled into the hopper.



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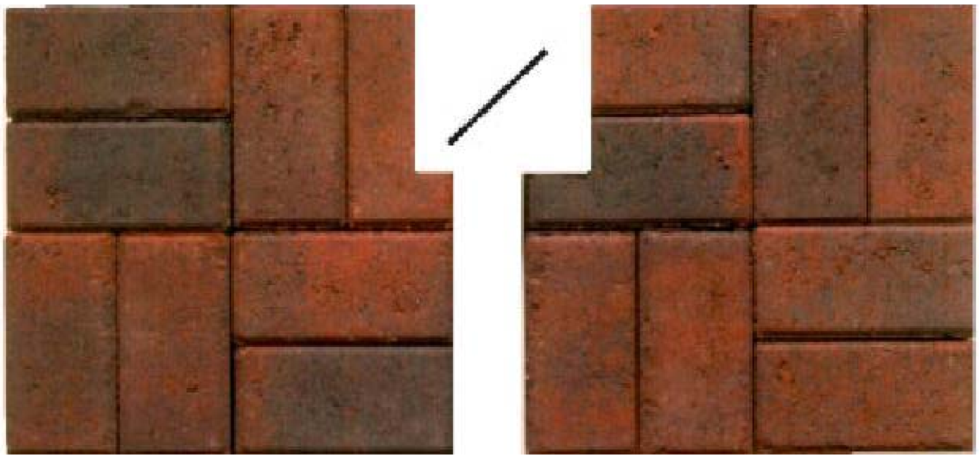

Picture 2

Process 3

Below the concrete mixer there is a twin-chamber hopper with the capacity of one mix per chamber. A conveyor belt of any desirable length is installed beneath the outlet of the hopper. A conveyor belt length of approx. 1 m is sufficient to achieve the two-colour effects. The separating wall of the hopper must be across the direction in which the belt is moving. The distance between the belt and the lower edge of the hopper can be between 2 and 4 cm. The belt carries the two concrete mixes simultaneously to the feed hopper of the concrete paving block machine. The quantity of concrete mix running out of the hopper can be regulated by means of a gate valve with adjustable height in the wall of the hopper (front hopper wall in the transporting direction). Picture 3 shows the construction of this device for the production of two-colour concrete blocks.

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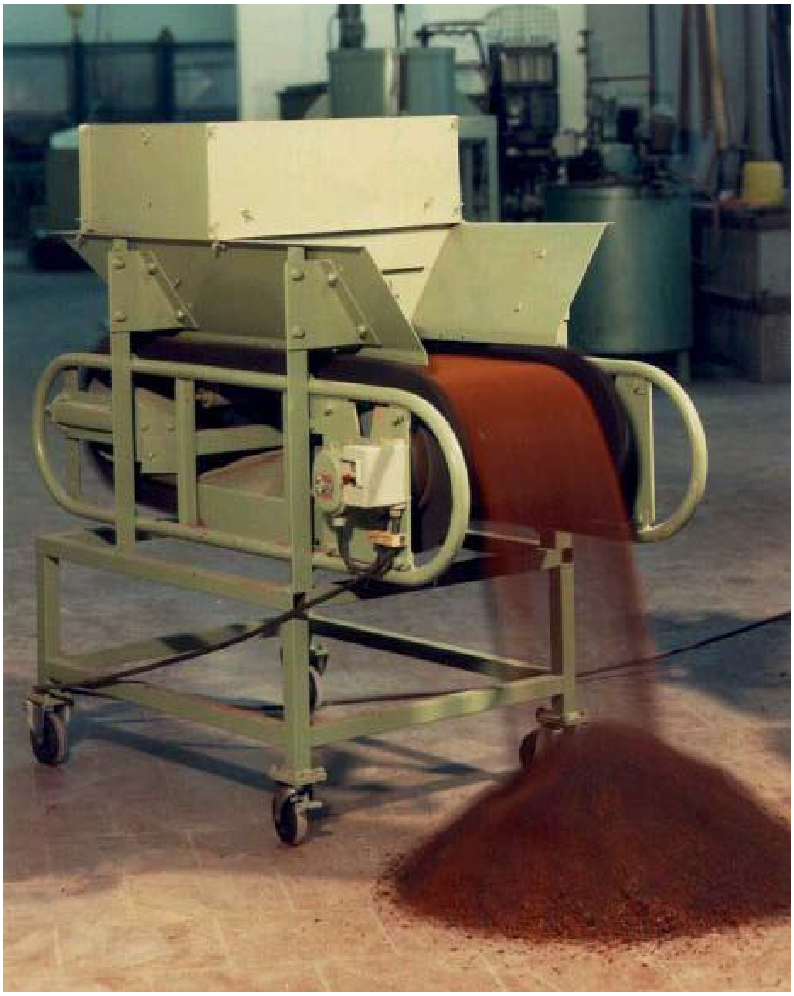

Picture 3

Which of these procedures should be preferred depends on the machinery available. Our trials carried out on a paving block machine as used in practice have shown that even with simple equipment good results can be obtained, e.g. by filling the hopper in layers.

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