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Westinghouse Adopts Reinforced Brickwork for Industrial Use

THE spread of the use of reinforced brick masonry has reached the great Pittsburgh industrial center. The Westinghouse Electric & Manufacturing Company has just completed, at its plant near Pittsburgh, a structure built entirely of reinforced brick masonry. The building is part of a general centralized storage at the Trafford City foundry. Extensions to the building are later to be erected.

The portion of the building already completed encloses three sand storage bins. The interest of Mr. A. Heckman, superintendent of building maintenance, light, heat and power of the Westinghouse Company was arrested at the first presentation of the reinforced brick masonry idea by Mr. Kenneth C. Milliken of the Milliken Brick Company, Wilkinsburg, Pennsylvania.

Other buildings of the group were built of brick and it was the desire of the engineers and architects of the company to have the new structure of the same material.

There was another factor which resulted favorably to reinforced brick masonry. The building is erected along one of the main railroad tracks entering the plant. It was desired to use fully the ground available for the building, leaving only actual clearance for trains passing over the track. Since walls of reinforced brick masonry are erected without forms or falsework of any kind, it was possible in this type of construction to build up to the line of clearance. Had a type of construction been used requiring formwork, the building would necessarily have to be reduced in size or located farther from the railroad track.

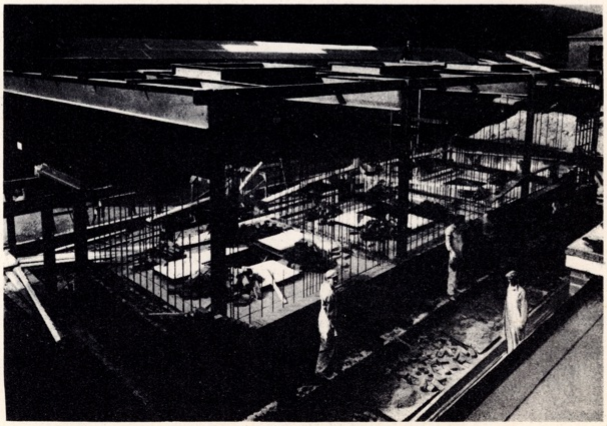
We are indebted to Mr. J. B. George, Works Architect of the Westinghouse Company, for the following detailed description of the building and complete structural information:

"In order to centralize a general storeroom at our Trafford City Foundry, a new building was planned.

"Part of the building is to be utilized for the storage of moulding sand. As the sand is to be received during the fall months only that part of the building housing the sand was erected, the balance of the building to be erected later.

"The sand storage required three bins 12 ft. x 12 ft. x 15 ft. deep. The bins were laid out in the building so that about 39 feet along a side wall and 14 feet along an end wall would require reinforced walls to withstand the pressure of the sand against the outside walls.

"It was first planned to construct the sand bin walls of concrete



J. B. George, Architect *Westinghouse Company Photos*

A view of the building during construction showing the plan of reinforcement

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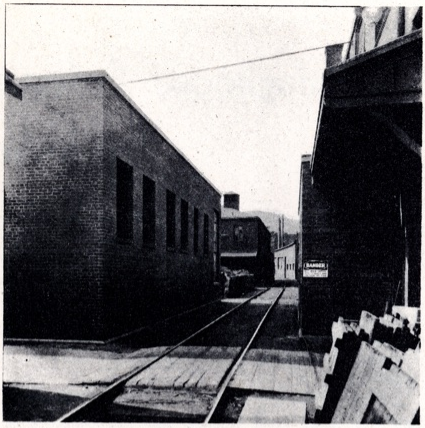
but, as the building walls were to be constructed of brick, it was then planned to face the concrete walls with brick, but this method would only add to the cost of construction.

"After obtaining information relative to reinforced brick, it was decided to build the sand bin walls of reinforced brick in order to match the balance of the building.

"When designing the bins, it was calculated that there would be a lateral pressure of 450 lbs. per sq. ft. near the bottom of the bins. Using the formulas for designing reinforced concrete, it was calculated that a wall 8 inches thick in compression would be required, adding 2 inches to protect the reinforcing steel would make the total thickness 10 inches for concrete. The reinforcing steel was calculated as follows:

"Horizontal ¾-inch bars on 4-inch centers 5 feet high, ¾-inch bars on 6-inch centers 5 feet high and ⅝-inch bars on 6-inch centers 5 feet high. Vertical bars were ⅝-inch on 9-inch centers 9 feet 6 inches long and 14 feet 6 inches long, spaced alternately. Additional bars were added around openings. The walls between bins were reinforced on both sides in order that one bin can be filled while the adjacent bin is empty.

"After calculating for reinforced concrete, it was thought that the same calculations could be used for reinforced brick, in that with a good cement mortar the compressive strength of the brick would be about equal to that of concrete and the steel would be the same in tension for concrete as for brick.



The danger sign warns: "Not room enough here to clear man on side of car"

"We might add that the walls were also calculated by the Brick Association Engineers and our calculations checked.

"In order to match the building walls, the brick was laid in regular bond with headers every sixth course. This construction required a space of 1⅞ inches for reinforcing steel between the 8⅛ inches of brick in compression and the 3¾-inch brick on the outside to protect the steel, making the total thickness of the wall 13⅞ inches.

"Standard common brick was used with mortar composed of one part cement, 3 parts sand and 20% lime. The lime was increased over the standard mortar in order that the mortar could be slushed around the reinforcing steel, as our own specifications specified that the bars were to be completely embedded in mortar."

Not only is the Westinghouse company to use this type of masonry construction but other industrial concerns in the Pittsburgh district will adopt it soon.

Editor's Note:

Fire hazards and accidents are reduced by the elimination of formwork on jobs such as described in the above article. These considerations, aside from the all important item of cost, promise a splendid future for reinforced brick masonry. The total elimination of all formwork on vertical sections shows a decided saving right at the start, and allows for the maintenance at all times of a clean job. Other items of construction in which the stripping of forms is almost impossible, can readily be built in this manner at a great saving.

It is to be expected that R. B. M. will be used only incidentally by engineers and architects at first, but as a greater knowledge of its value and adaptability is gained there can be no doubt that its use will be found expedient in more and more cases. No professional man can afford to ignore its possibilities in servicing his client. Its design is more and more cases. No professional man can afford to ignore its possibilities in servicing his client. Its design is practically the same as in reinforced concrete. Any Brick Manufacturers Association office can furnish more complete details.

BRICK ENGINEERS' DIGEST

The dearth of organized and collated information on brick masonry is becoming increasingly evident. It has too long been considered a subject about which there was little to learn.

The Brick Engineers' Digest will fill this lack in your technical files. Our purpose is to give you indexed reprints of valuable articles on brick construction, with readers' comments and authors' corrections added, thus increasing the value of the articles.

These reprints will bring your files up to date, for quick reference, on the latest data on the subject.