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The Cement Mill Edition of *Concrete*

The Cement Mill Edition of CONCRETE is edited exclusively for those interested in the manufacture of portland cement and related products.

Its pages are devoted to discussions of plant design, management, operation, production efficiency, chemical research and control, quarry operation, progress and news of the industry.

The Cement Mill Edition also contains all the material published in the corresponding Regular Edition and so provides news of the uses and merchandising of the materials whose manufacture is discussed in the Mill Edition.

The Regular Section furnishes mill operating officials and mill executives valuable points of contact with the users of the materials they produce.

The subscription price is $4.00 a year in the United States and its possessions, and Mexico. One dollar additional for postage in all other countries. Current copies, 50 cents each.

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CONCRETE is indexed in INDUSTRIAL ARTS INDEX, which may be consulted in any Technical or Public Library.

10. The shape distribution of the products from jaw and gyratory crushers was similar. A typical shape distribution of the products shows that the crusher oversize is composed principally of pieces of intermediate shape. At the size of the crusher opening about 80 per cent of the product consists of cubical material and only 1 or 2 per cent of slabs.

At succeeding smaller sizes the percentage of cubical material decreases and the percentage of slabs increases. The —1.05-in. size is composed of about 60 per cent cubes and about 8 to 10 per cent slabs. The shape distribution in the sizes below the —1.05-in. size remains about constant.

11. The shape distribution of the product from the swing-hammer crusher is the same in all sizes. The product contained between 80 and 90 per cent cubes and about 1 per cent slabs at each size.

12. Slabs are formed principally by radial cracks caused by compression and are preponderant in the smaller sizes. The larger sizes are predominately cubical pieces, resulting from impact cracks through the material normal to the crushing faces.

13. Crushing is caused largely by compression in the jaw crusher, the gyratory crusher, and the single-roll crushers. While large pieces in the single-roll crusher are broken by the impact of the slugger teeth, the crushing is finished by compression as soon as the pieces are reduced sufficiently to be nipped between the roll and the concave. Crushing is caused entirely by impact in the swing-hammer crusher.

14. Comparison between the Blake-type and gyratory crushers indicates that the size distribution and the shape distribution of their products is similar under conditions of feed and operation.

Appraising the Risks From Industrial Dusts

TWO bulletins outlining "how" measures for combating industrial disease and for guarding the health of industrial employees are being distributed by Air Hygiene Foundation to its member companies.

One of the bulletins deals with the subject of lead poisoning—a problem with which the cement manufacturing industry is not concerned. The other bulletin is a guide for appraising risks from industrial dusts. This publication, headed *Identification of Industrial Dusts*, points out that the inorganic materials found in industrial dusts are largely minerals, although many artificial substances are also encountered. Chemical analyses of mixtures of such materials seldom reveal the percentages of the various minerals present. However, each mineral has characteristic optical properties that can be determined microscopically with the aid of polarized light.

This method of identifying minerals by their optical properties is known as optical mineralogy. The identification of industrial dust is accomplished best by using petrography as the basis of analytical work and supplementing it whenever necessary with chemical determinations, the bulletin states. Characistics of a few "minerals commonly found in dust" are listed, and dusts are classified in four general groups for purposes of identification.

The bulletins are part of a series prepared by the Preventive Engineering Committee of Air Hygiene Foundation, of which committee Prof. Philip Drinker, of Harvard, is chairman. Others issued this year include one on the "Use and Care of Respirators," another on "Design of Exhaust Hoods," and one on "Design of Duct Work for Exhaust Systems."

Offices of Air Hygiene Foundation are at 4400 Fifth Avenue, Pittsburgh, Penna., with John F. McMahon as executive assistant.

Effect of Glass Content of Clinker Upon Heat of Hydration

THE Portland Cement Association Fellowship established at the National Bureau of Standards, Washington, D. C., has published a new bulletin as *Paper No. 36*, under the authorship of William Lerch and under the title of *Effect of Glass Content Upon the Heat of Hydration of Portland Cement.*

In the investigation reported, the heat of hydration was determined, by the heat-of-solution method, for a number of portland cements prepared from clinker which had been subjected to various heat treatments to produce different glass contents. The results indicate that, when different cements are ground to about the same degree of fineness, the quantity of heat evolved between 7 and 28 days will be dependent on a number of factors. The composition of the cement and the glass content of the clinker are two of the most important of these factors. The glass content not only influences the heat of hydration directly, but also influences it indirectly, through its effect upon the true compound composition.

No consistent relation was observed between the glass content and the quantity of heat evolved at the age of 3 days. At 7 and 28 days the quantity of heat evolved for any given composition increased consistently with increasing glass contents. Reasons are advanced to explain why the difference in glass content, together with the changed compound composition resulting therefrom, may affect the heat of hydration of the cement at various ages.

Gypsum and Lime Plants In United States

COMPLETE maps of the principal gypsum plants and the lime plants of the United States have been compiled and published by J. H. H. Muirhead, 230 West 108th Street, New York City.

Each map includes the name and location of each plant, the names of the companies being grouped by states. It is a matter of interest to observe that gypsum plants are found in 31 states, and lime plants in 44 states.

Allis-Chalmers Branch Office in Newark

ALLIS-CHALMERS Manufacturing Company, of Milwaukee, has established a new branch office and warehouse in the Industrial Office Building, 1060 Broad Street, Newark, N. J. The new office will be a branch of, and under the jurisdiction of, the New York district office of the company, and will provide additional service in the Newark area for motors, pumps, texrope drives, power transmission units, and other equipment in the company's line.

C. A. Pihl has been appointed as Newark branch office manager.

Editorial Discussion

Conveying Equipment in Cement Plants

An article in this issue emphasizes the great extent to which conveying equipment of many different types is used in the process of cement manufacture.

In the average plant it may be said that the material of which cement is made is carried along the mill stream in or on some form of mechanical conveyor from the time it leaves the crusher until the final product is shipped from the plant. This is literally true except, of course, for the stops made to undergo further processing. In a few notable instances where the rock is transported from the quarry to the plant by means of cableways, the conveying activities actually start at the quarry.

Throughout its plant operations this industry utilizes belt conveyors, screw conveyors, pneumatic pumping systems, bucket elevators, apron conveyors, and various other types, some of which are special type developed for special uses.

Mechanical conveying is both effective and economical, for it acts continuously and keeps the materials constantly on the move between successive stages of processing.

Preventing Dust Through Engineering Control

The prevention of silicosis may, in one sense, be regarded as a matter of comparatively small concern to the cement manufacturing industry, for the reason that the rock dust and cement dust particles present in the atmosphere of cement plants do not actually produce this disease.

On the other hand, while the assertion just made can be proved from the medical and scientific standpoints, this does not necessarily mean that courts and juries can be convinced of these facts.

In a word, the human element that enters into this phase of the subject is one that can be counteracted only by taking measures to prevent the presence of dust particles in the atmosphere wherever workers are employed, or to reduce the quantity of such dusts to a point where their presence is not ordinarily noticeable.

It is this angle that gives importance to the final report of the committee on the prevention of silicosis through engineering control, serving under the auspices of the United States Department of Labor, of which committee the chairman is Warren A. Cook, of the Connecticut State Department of Health. The final report of this committee has been published by the Department of Labor as *Bulletin No. 21, Part 2.*

Plant design and renovation, good plant housekeeping and maintenance, and the installation of dust-collecting systems at the sources of the dust, are among the major preventive measures recommended by this committee. In the case of the cement manufacturing industry, these measures are necessary, not for the purpose of preventing silicosis, but for the purpose of preventing damage claims in court.

Copies of *Bulletin No. 21, Part 2,* may be obtained either through the Division of Labor Statistics, United States Department of Labor, or from the Government Printing Office at Washington.

Identification of Industrial Dusts

The preventive engineering committee of the Air Hygiene Foundation has prepared a number of valuable treatises on industrial dusts, which have been published as *Bulletin No. 2.* Part 7 of this series, recently issued in a separate form under the heading *Identification of Industrial Dusts,* classifies this problem in a way that permits uniformity both in the methods of tests and in the analysis of results.

For the purpose of identification, industrial dusts are classified into four different groups. Only two of the groups are involved in cement manufacture. One of these is the group composed chiefly of soluble materials, limestone being mentioned as one of the materials. The other is the one composed of insoluble and inorganic materials.

The conclusion reached by the writer of this paper is that identification of industrial dusts is accomplished best by means of petrography as the basis of the analytical work, supplementing it wherever necessary with chemical determinations.

Heat Loss Through the Kiln Shell

Heat lost by radiation through the kiln shell remains as one of the big problems for cement mill technologists to solve. Much thought has been given to it, and much progress has been made, more especially through the practice of placing a layer of insulation blocks between the firebrick and the shell of the kiln. This has been common practice for more than ten years.

It has been found necessary, however, to omit the insulation blocks throughout the burning zone, even though this is the zone of greatest loss of heat through the shell, because the insulation blocks can not stand up under the high temperatures encountered in this section of the kiln. Here, then, is a possibility for at least a partial solution of the problem—the development of a refractory lining that *will* remain intact under the maximum temperatures attained in the burning process in cement manufacture.

The magnitude of this problem may be judged from the amount of the loss of heat—estimated by various authorities at values ranging from 158,000 to 227,000 B.t.u. per barrel of clinker.

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