REGULATION AND CONTROL OF CONCRETE CONSTRUCTION.*

By E. S. Larned, C.E.

The rapid changes and developments during the past five or six years in municipal works, railroad construction, terminal improvements and rapid transit, and in building construction for manufacturing, mercantile and residential uses, have furnished the theme for many contributions to engineering and cement publications, and are strikingly reflected in the wonderful expansion of the Portland cement industry; the production during 1906 of 45,610,822 barrels showing an increase of 438 per cent. over the output of 1900, and about 26 per cent. increase over the previous year, 1905.

The manufacturer of Portland cement is now confronted with a situation both gratifying and alarming—his product is growing in favour, nevertheless, he is in danger of serious injury, only temporary, to be sure, but none the less real, from the friends and advocates of his product, some of whom, in their zeal, inexperience and unlimited confidence, attempt the impossible, or perhaps are quite impossible in the attempt, however legitimate.

The extent of public interest at this time in cement construction cannot be measured by the present output of our Portland cement mills, and when the known desire to build in cement comes to be fully realized on the part of our laboring classes, artisans, clerks, and farmers, this vast army of home-seekers and home-makers, the output of the cement mills must show a further increase that will dwarf even the present handsome figures.

The great problem confronting us now is to properly and adequately meet, foster and encourage this widespread interest and yet not permit it to grow beyond a safe control; by this I mean that every effort should be made to avoid and prevent the mistakes, failures and disappointments that surely attend undue haste and want of preparation in the way of proper design, intelligent supervision and employment of trained and experienced men. All this has been found necessary to avoid failure in the use of other materials of construction, then why not in the use of the plastic material?

It will not add to the cost of construction in cement to effect this, but rather result in economies through greater efficiency and better progress alone. The same proportion of unskilled or common labour may be used, only we should seek to train and improve it, and always keep it under competent supervision in constant attendance.

The general public—architects, engineers, and contractors—must be brought to recognize the fact that while cement in concrete construction is a very important element, nevertheless, the other materials with which it is combined and the manner of mixing and placing the materials and the forms to contain them are also of prime importance, and should be submitted to the same inspection, preliminary tests and approval of competent authority as may usually be required of the cement.

The proportion of sand to cement should never be fixed in advance of sufficient knowledge of the character and quality of sand available for the work in hand; if this be found inconvenient or seemingly impractical, then the proportions should be open to easy adjustment and should be provided for in advance in the contract. Available and proposed sand should always be tested and compared with some recognized standard before use.

The public demand for cement construction cannot be met at this time, not for want of cement, but because we have relatively so few builders and contractors qualified by experience to undertake this class of work; and showing the cumulative effect of such condition, this fact has in a large measure prevented architects from designing in concrete and urging its adoption for residential uses.

A most promising and encouraging feature in the industry, however, is the organization of construction companies, officered by engineers and experienced contractors, who are making a specialty of concrete work, and it is perfectly reasonable to expect that their efforts will result in further improvements and economies in ways and means, also in the appearance and quality of finished exposed surfaces; a field affording great possibilities and much promise already.

In the flush of their first successes, however, let these companies pause and consider the danger of allowing their work to grow beyond their capacity to properly direct and control.

The cement industry cannot rest satisfied with a national interest in the product at this time, but must create even a broader confidence by the encouragement of prudent and rational safeguards, lest their omission be followed by unfair and discriminating restrictions on the part of local municipal building commissions.

Trade jealousies are keen and alert, and every failure or disappointment in concrete construction, however infrequent or unimportant, is amplified and accentuated.

It was thought at first that this publicity would seriously retard the progress of the new industry; but not so, and this fact can only be taken as further evidence of the wonderful vitality of this form of construction. It has also come to be generally known and admitted, as a result of rigid and thorough investigation, that each instance of failure has been the result of ignorance or criminal carelessness, and almost without exception, has occurred during construction. Is any material of construction proof against such causes?

The scores upon scores of splendid examples of concrete construction, in all departments of engineering work, and among all classes of buildings, leave no room for doubt of its success from the standpoint of adaptability, appearance, economy, and durability, under conditions of exposure that no other material now used in construction can so successfully and economically meet.

The greatest economy and best results structurally and architecturally, however, cannot be obtained, except by competent design and intelligent sympathetic treatment of outline and texture, with due regard to environment, exposure and available materials composing the aggregate, of which we have an endless variety, by selection and combination; and then the work of construction must have the equivalent in intelligent and honest supervision that any reputable job receives; in fact, it might have even more and still cost less than is represented in the person of the boss carpenter, boss brickmason, general foreman, sub-foreman and superintendent, all of whom are in constant attendance.

No other department of the cement industry has so felt the need of standard specifications and uniform instructions as we find in the manufacture of cement blocks.

There is to-day a large and growing demand for this material, and its general and almost unlimited use is only retarded by lack of confidence on the part of architects, builders and resident owners who see only the wretched results that attend the efforts of the misinformed and inexperienced, and overlook the splendid possibilities of this form of construction in the hands of skilled and experienced operators.

In considering the requirements that cement blocks should meet as a structural material, we must take into account the use in which they are to be put.

We have in brick classification, the term cotta brick, mud brick and dry pressed face brick, and the hard burned medium and light common brick; all of which find extensive and legitimate use, and yet vary widely in strength, fireproof qualities and appearance.

The granites, limestones, sandstones and marbles are generally accepted in first-class construction, and yet differ greatly in weather and fire resisting qualities.

Lumber, of course, is very combustible, and yet the different varieties show marked contrast in strength, dura-

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