

bedded in brickwork, masonry, or terra-cotta, will suffer from the action of rust, more particularly when located in the basement and foundations of a building; hence the necessity for really efficient protective material becomes perfectly clear.

Cement and Cement Concrete as Efficient Preservation.

During the writer's examination of the steel-frame system of building construction in the United States, he enquired into the methods in use for preserving from oxidation the iron and steel employed in buildings. He learned that a covering of high-class Portland cement had proved an excellent preservative for iron and steel employed in the most trying situations. It had been found that the expansion and contraction of the metal, owing to temperature variations, had synchronized with the expansion and contraction of the Portland cement, and that the removal of steel columns and beams after some years of service had shown that the coating of Portland cement had effectively preserved the metal from any appreciable oxidation or rusting effects.

Further demonstration of the preservative qualities of Portland cement is furnished by instances cited by various speakers, in a discussion on the preservation of materials, at a meeting of the American Society of Civil Engineers. The following facts are abstracted from the record of the discussion:

Mr. Rudolph P. Miller stated that, on the demolition of a modern steel skeleton building four years old, in New York City, the floor beams and girders, encased in cinder concrete, were found to be remarkably free from rust. Where there was any, it was in very small patches, more generally on the rivet heads, and it was probably there before the floor arches were placed.

Mr. George Hill, while admitting his interest in a paint business, expressed his conviction that steel which had been properly embedded in concrete remained absolutely unimpaired and perfect in its condition. He mentioned a series of experiments made by him for the representatives of the Melan system of reinforced concrete, in which steel bars were embedded into stone concrete. After exposure to the weather for from sixty to ninety days, wherever the concrete had been in contact with the steel, no rust showed at all. The steel was not painted, and showed bright; but wherever there were voids in the concrete, due to the use of rather dry cement with a stone aggregate, rust had set in.

In the same volume of the proceedings it is recorded that Mr. George W. Dickie, of the Union Iron Works, San Francisco, had used Portland cement for many years, with very satisfactory results, for the protection of iron and steel from corrosion. As an example it was stated, that while recently repairing the iron hull of a ship, Mr. Dickie had occasion to remove a portion of the cement floor which had been laid some forty years before, and the iron beneath the cement lining was then found to be absolutely free from rust. The fact that the cement was exposed to the most active kind of corrosion—that caused by sea water—makes this experience a very strong argument in favor of Portland cement as a preservative of steel.

Turning now to experimental testimony, we may refer to the conclusions drawn by Professor Norton from his extensive series of investigations extending from 1901 to 1904. These researches demonstrate conclusively that neat Portland cement, even in thin layers, is an effective preventive of rust, and that cement concrete is equally effective if without voids of cracks and imperfect contact with the metal, but that it is of the utmost importance that the metal should be perfectly clean when bedded in concrete.

The absolute necessity for preventing the presence of voids near the metal was clearly established by Professor Norton, and is also indicated by the experience of Mr. Hill, stated before the American Society of Civil Engineers.

This is a point that should always be borne in mind, and another is that the cement used must be of really good quality. If these precautions are neglected there will certainly be risk of corrosion. On the other hand, if Portland cement grout or concrete of approved quality be properly

applied there is not the slightest reason for fearing the corrosion of the iron or steel embedded in or covered by the material.

It is very important that the absolute safeguard offered by Portland cement should be universally recognized, especially in view of the recent injudicious repetition of rumors to the contrary.

The chemical reactions underlying the setting of Portland cement may to some extent explain its preservative influence. Any ordinary moisture present on the metal owing to the application of the cement will be absorbed in the setting process, so that one active element of oxidation will be removed. As the alkaline character of the cement serves to neutralize any acid, another destructive agency is counteracted. Further, as Portland cement is practically impervious to the penetration of air, oxygen cannot gain access to the metal to establish and maintain the process of corrosion.—From "Concrete and Constructional Engineering," London.

THE ART OF HANDLING MEN.

We learn from the "World's Work" that it is the experience of those who have made it a careful study that it is not a wise policy for the executive head of a business to do much, if any, detail work. He may think—and it may be so—that no one else can do the work as well as he, but he should be able to judge whether his subordinates are doing the right kind of work, and their reports to him should show to his trained mind whether the work has been properly performed.

He should see that they give details in their reports so concisely and correctly that they can easily be digested when they reach him.

The executive head should have the salesmen, the bookkeepers, the shipping clerks, and all of the working force, report to the heads of their several departments, and the executive head should require such heads to in turn condense the reports into intelligible statements for him.

The executive head, by being systematic, will soon have a most satisfactory system at work, the success of which will mean his own success.

If the executive of an institution recognizes and encourages the heads of the various departments, they will in turn encourage those under them, and all the machinery of the institution will run smoothly. Encouragement should be given all along the line, and all suggestions, no matter by whom made, should be listened to, for very often good suggestions are made by even the most lowly employees.

Above all other things, however, the chief executive should bring into regular conference heads of departments, officers and factory committees and secure their ideas.

Regular conferences with the various salesmen should also be part of the system.

By so doing the chief executive will have the benefit of the points of view of the men intimately in touch with the work that he is superintending. Even their enquiries and objections may be of value.

Another point in the management of subordinate heads of departments, is to provide everyone with an understudy.

FRIVOLOUS USE OF THE TELEPHONE IN WASHINGTON, D.C.

A quiet investigation has been under way in Washington, D.C., for about two months, from which, according to a newspaper despatch from that city, it has been learned that of the telephone calls by government employees during office hours about 23 per cent. were for the government service and 77 per cent. were personal calls. The newspapers publish the following interesting record for the Treasury Department: Government business, 23 per cent.; dinner engagements, 12 per cent.; theater, 28 per cent.; poker engagements, seven per cent.; bucket-shops, eight per cent.; loan companies, four per cent.; social, twelve per cent.; miscellaneous, six per cent. Fifty-three per cent. of the calls were made by male employees and 47 per cent. by females.