

9. Proper means to be adopted as a stimulus towards building.

It will be noted that the subjects selected are of a general character in both Americas.

The Executive Committee is headed by Mr. Horatio Acosta y Lara, president; Mr. Jacabo Vasquez Varela, vice-president, and Mr. Fernando Capurro, general secretary.

The honorary secretary of the R.A.I.C., Mr. Alcide Chausse, is in position to give all necessary information to any architect desiring more particulars.

## Co-operating on Safety

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It is only in recent years that any discussions whatsoever have been had in reference to the hazards of building construction, and aside from statistics issued by the several insurance companies, no organized effort has been made by the contractors generally to exchange ideas toward the elimination of accidents. However, the present day finds that several of our larger contracting organizations include a so-called Bureau of Safety, and their results have shown a remarkable reduction in the number of accidents, as well as an immense saving of lost time and money.

In order to develop a proper safety campaign for the particular job in hand, an analysis is necessary, for the work itself is suggestive of the major portion, or rather kind of possible accidents you will be obliged to combat. I do not mean to say that you can immediately eliminate all accidents, but certainly a study of former accidents on a similar piece of work will help greatly in a reduction of accidents on future work. To just such work, namely, analysis and issuance of instructions, is a safety bureau dedicated.

Of course, there are and always will be special pieces of work that must be accomplished which are different from any former, but I still maintain that the same fundamentals apply and that an analysis still can be made and preventive measures applied.

To follow this discussion briefly, and to support the former statement that the work in hand will suggest possible accidents, it is evident that the sewer or grading contractor, for instance, can, by a series of test holes, determine the character of soil he is obliged to excavate, and plan his working methods accordingly. Such procedure will tell him quickly what he must provide in the way of equipment and protective measures, and has the further advantage of not catching him unawares as far as unforeseen ground conditions are concerned.

The present day of multiple-story buildings, when radical changes in their construction methods are being employed, finds us facing the source of the greater number of accidents, as is attested by the high insurance rates. Usually the public comes in for consideration, as far as safety methods are concerned, and in fact no other class of structure requires more consistent planning or forethought as regards accident prevention, unless it be in tunnel or subway work as installed in our larger cities. For this work it is plain that proper and substantial equipment must be provided, that possesses a good, safe factor; the sidewalks and streets must be covered; riding loads and in hoists must be forbidden; stairways and ladders must be liberally provided; mechanical safeguards installed; rapidly moving load lines and signal cords boxed or otherwise protected; safety belts and scaffolds provided; and even a man's clothing must receive attention, for many a man has lost a hand by reason of his wearing a gauntlet glove, and others have lost arms and life because of a loose sleeve or glove which dangled into revolving drums, or shafting, or which were caught by a broken strand in a cable.

Heavy foundation work requires the same care in accident prevention study, both in bridge and in building work.

Pile driving is another hazardous piece of work, where

moving timbers and lines are responsible for many avoidable accidents.

Wrecking and underpinning are other sources of accidents, and more numerous undoubtedly than should be because they do not receive the attention of an engineer as regards a plan, or in other words, the average wrecking contractor does not have a staff or an engineer in his service to make calculations before doing work. As a result, defective material is often used and insufficient underpinning installed, causing accidents, of course.

Heavy rock excavation requires care in handling dynamite, and precaution against flying rock and destruction of property.

Industrial building work is the source of possibly the greatest variety of accidents, but usually not as disastrous to life and limb as the previously mentioned classes of work.

An analytical study in the direction of safety, no matter what the class of work, will certainly produce results if undertaken with the same spirit in which a construction engineer plans his layout and schedule.

### Employees

In a large measure the application of safety methods depends on the employee. The more intelligent, the less liable is he to accident. In this respect, the ironworker or steel erector is possibly the most versatile in that he thinks of the possibilities of things happening in connection with the work in hand, and is not so easily caught unaware. The brickmason and carpenter are usually on more substantial footing and inasmuch as their work is usually more regular, do not have occasion to give "possible happenings" much thought. No other mechanic requires good judgment more than the hoisting engineer, especially be he engaged on multiple-story building work or heavy bridge construction. The common laborer, however, requires more watching than the trade mechanics, and in this respect much depends on the intelligence of the foreman who directs his movements. All workmen, however, can be schooled in safety methods as has been demonstrated by leading contracting companies who have safety bureaus. For instance, Fred T. Ley and Company began this work in 1915, and their reduction in accident rate per 1,000 employees for 1916 was 25 per cent, and in 1917 was 55 per cent, which is indeed encouraging.

### Character of Accidents.

Our records, from a recent piece of construction, which involved steel erection, heavy concrete, brick work, and grading, also trackwork, show, from a total of 242 accidents, that: 73 employees sustained bruised fingers from handling material, 37 employees sustained punctured feet from nails, 11 employees sustained cuts on head from falling material, 7 employees sustained sprained ankles, slipping and misstepping, 7 employees sustained cuts on hands, and the balance were minor injuries. This work comprised the erection of a large engine terminal, and this record conforms in the average to the class of accidents which we must safeguard against in the course of our regular industrial building construction.

I find in comparison with figures as derived by other concerns, that the accidents in the main are similar in character, but the percentages vary, due undoubtedly to the character of the work in hand.

The greatest number of accidents, we find, come during the handling of material, and are confined to hand injuries; second in number come injuries to feet from protruding nails; third, employees falling, by reason of misstepping or stumbling over strewn material, causing sprained or broken ankles, broken arms or legs; fourth, falling material, causing cuts about the body and broken limbs. These are the four main causes as we find them, and it is natural, therefore, that preventive measures be provided in the order named.

I believe it goes without question that a job properly planned, and scheduled whereby one phase of the work closely follows the other, where material is received and handled in the same order and where orderliness prevails throughout, is rewarded by the least number of accidents.

Receiving and storing of material is a study in itself, for naturally the best position must be selected for hoists, and also for storage. One should be near the other to avoid rehandling and increased costs, and minimum handling also reduces the possibility of accidents, as is plain. But often they are far apart, causing long runways to be built and arranged, in and out, around or through a building, as the case may be, creating a state of disorder and interfering with the other divisions of the work. The ideal, of course, is one where, for instance, structural steel can be placed from car to position, elimi-

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