

*Victor F. B. de Mello* <sup>(1)</sup> (BRAZIL) — It seems strange that we should have to return to the subject of the very terminology within the field of residual soils, which was discussed about a week ago within session Ib; however, profiting of the support lent by Dr. Nogami's presentation, and seeing that the orientation we had presented within that session seems to have been lost by the wayside in the interim, we deem it justifiable to take up the matter again.

We fully concur with Dr. Nogami's statement that there is no apparent difference within the upper horizon of "porous red clay" between those clays that derive from the mature decomposition of the underlying bedrock, and the sedimentary clays transformed into a porous clay. Therefore for those of us who deal principally with soil mechanics it inescapably results that such soils should be described with reference to their grain size and plasticity characteristics, with but complementary information inserted on an estimate of their origin for eventual secondary interest.

Further, we are all in accord that there is no sense whatever in calling the underlying horizons merely by the label of "residual soil": a residual soil either is described as residual of some specified rock, which imparts to it some of its peculiar characteristics, or there is no reason or purpose in describing it as residual. Thus, for instance, as we frequently observe in our decomposed sandstones, a residual soil derived from a sedimentary rock often presents a behaviour so similar to that of a sediment as if it were one.

A second point that I should like to emphasize is that the "in situ" tests reported by Dr. Murillo Ruiz focussed an important contribution of cement grouting in rock masses. The principal effect of such grouting is to combat anisotropy and heterogeneities inherent in rock masses because of their open jointing. Although the specific set of test results reported might merit the suggestion that it should have been extended in order to ward off the criticism that some of the differences purported to be significant, are observable in the same order of magnitude within tests under similar conditions, it is an indisputable fact that the concept presented by Dr. Ruiz already finds support in extensive other test evidence; the effect of cement grouting in taking up open joints and thereby significantly altering the deformability of the rock mass, is uncontested.

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Thus, in connection with the use of grouting in order to take up the open joints, the existence of its direct and finite effects is uncontested. The problem in connection with the sundry treatments applied in dam foundations lies in establishing if, upon taking into due account questions of probabilities and the practical inefficiencies involved, one may reasonably guarantee attainment of the indirect, and usually more complex, effects sought. In this respect it is therefore indispensable that one maintain the open mind and flexibility inherent to the very concept of engineering, in order that in accordance with the needs of the project one may seek the anisotropies of the joints in the most effective manner possible. A manner of treatment that involves perforations and, in complement, the infiltration of a liquid in various directions from each hole, inevitably has much greater probabilities of picking up open joint heterogeneities and anisotropies, than a process merely of perforation, such as is a line of relief holes. Mere curtain perforation cannot geometrically achieve the feat of picking up as many open joints as a similar line of holes subjected to grouting, which, incidentally, relies upon the additional indisputable advantage of allowing a liquid, or as nearly so as possible, to seek the discontinuities which another liquid should be apt to find.

One should emphasize, therefore, that the discussion on the choice between grout curtains and relief-hole curtains cannot be maintained on the simplified terms on which it is frequently debated, on the basis of homogeneous masses without discontinuities, and without emphatic reference to which are the direct and indirect effects really sought.

*H. V. Rimoldi* <sup>(1)</sup> (ARGENTINA) — Los panelistas de esta sesión han abordado los diferentes temas sugeridos, permitiendo una rápida visión de conjunto de algunos aspectos del panorama que ofrece la geología aplicada. Glosando un poco lo expuesto por el Dr. Golder al iniciar los debates de esta sesión, diremos que se puntualizó una vez más, a través de las distintas exposiciones la necesidad de una estrecha interrelación entre la ciencia que estudia la génesis del suelo y las rocas y la ingeniería. Esta última se debate en establecer una valoración mediante fórmulas que permitan un encuadre dentro de determinados standards, de modo tal que

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