IX c 14

DISADVANTAGES PRESENTED BY INJECTIONS OF CLAY SUSPENSIONS

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SUMMARY OF THE FRENCH REPORT

Contrary to cement suspensions used in injections - which fix chemically when curing a considerable quantity of water serving for crystallization of silicates, aluminates and silico-aluminates - common clay suspensions usually absorb by means of simple physical linking a relatively reduced proportion of water. Consolidation of a porous medium through elutriation of clay, will therefore be defective.

Whereas a suspension of cement is easy to prepare by simple mixing, a clay suspension, stable enough to permit injection without the risk of premature sedimentation, requires special attention.

The problem we have set ourselves is to :

1e Prepare a stable suspension of clay;
2e Produce in the soil a floculation after injection;
3e Obtain a sedimentation containing a maximum of absorbed water.

Moreover, we purposedly confined ourselves to the use of common clay. We endeavoured to prepare therewith suspensions presenting in a lesser degree the characteristics of special and expensive clays such as Bentonites, Waterjellies, Stearic Clays.

Preparation of the Suspensions :

1e Clay suspension is stabilized by addition of a solution of potassium soda, sodium carbonate or sodium silicate. The concentration of alkali or alkaline salt depends on the density of the suspension, on the nature of the clay and that of the delution water.

2e Floculation of the above stable suspension is obtained by adding a certain quantity of strong electrolyte, i.e. sulfate of alumina; one remarks that the floculated sediment has a variable volume according to the amount of electrolyte which has been added. This volume reaches a maximum value for a determined amount of floculent. The mix corresponding to this maximum value of sediment, is used for the injection. Thus, the greatest possible quantity of water is retained in the sediment in the shape of water physically linked with the clay, and the efficiency of the injection is considerably increased.

3e The suspension thus prepared produces a flaky sediment of very considerable volume which may amount to 80 or 90% of the total volume of the suspension. Besides, the suspension presents such a degree of viscosity and density, that it is possible to add thereto a high proportion of coarse clay or loam. By this procedure loose soils with a high ratio of voids may be treated more economically.

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IX c 15

THE LAC NOIR DAM
CONSOLIDATION AND WATER-PROOFING

ENTREPRISE DE FONDATIONS ET TRAVAUX HYDRAULIQUES, Paris

SUMMARY OF THE FRENCH REPORT

GENERAL

Above Colmar, in the Vosges, there are two lakes, called LAC NOIR and LAC BLANC and as far back as 1850 hydraulic works were undertaken with the object of regulation the flow of streams coming out of the lake and watering the Orbey valley in the Haut-Rhin Department.

These lakes are of glacial origin and belong to the type known as 'periglacial dolina'. They are bounded on one side by the natural dam formed by the glacial moraine composed of a mass of sandy clay containing granite blocks of all sizes.

The natural level of the Lac Noir is 945 metres (3100 feet).

Works composed successively of a plain wall, a dam built of all in morainic material with a central core, and then a dam with a wall at the foot and a facing on the water side were built between 1850 and 1905.

In 1932 a hydro-electric scheme for the harnessing of the Lac Noir and the Lac Blanc, was carried out by the Société Hydroélectrique des Vosges.

A deeper foot wall was built in front of the Lac Noir dam. Lac Noir, hitherto a seasonal reservoir with a slow variation of level, became a daily reservoir with an extremely rapid variation of level, up to 18 metres (60 feet) per day.

The main characteristics of the job are as follows:

Length along the crown of the Dam.	76 metres	250 feet
Height	15 -	50 -
Height above sea level of the crown	954.5 -	3130 -