III-276 **THE EFFECT OF CALCIUM CARBONATE CONTENT ON ENGINEERING PROPERTIES OF MARLY ROCKS.**

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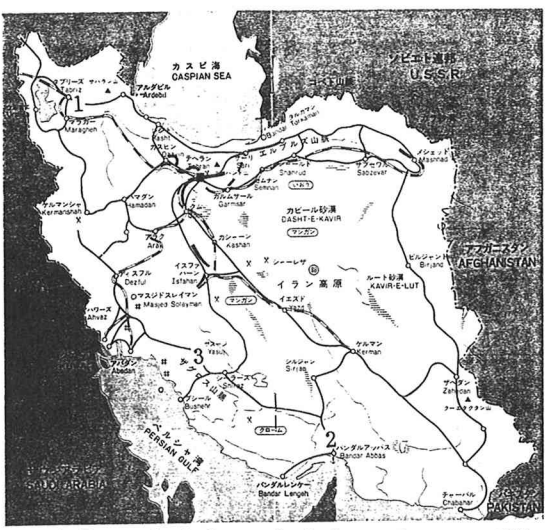
INTRODUCTION:

Marl,a common rock within sedimentary sequence in Iran,fundamentally is defined as a mixture of clay and calcium carbonate content in which its carbonate content is between 35 to 65 percent,but this term used for any mixture of clay and calcium carbonate,such as kupper marl in England that its calcium carbonate content varies between 0-30 percent (Bell 1983).

METHOD OF STUDY:

This study is based on combination of two data group:1)geotechnical data of three geological marly formation of Iran(Map 1), That gathered from geotechnical investigation report of some engineering project,2)result of complementary tests done on the samples from different depth of these formations.



1:Group1, 2:Group2, 3:Group3

Map1:Location map

COMPLEMENTARY TESTS AND DATA ANALYSIS:

X-ray investigation and calcimetery: X-ray analysis showed that clay mineral of all samples are the same and the main clay mineral is montmorillonite.Based on calcimetery test,the calcium carbonate content of studied rocks are as follow:group1 10-22%,group2 29-35%,group3 49-55%.

The effect of change in calcium carbonate content on some engineering properties of studied rocks are as follow:

Consistency limits: Samples powdered to pass through a 200 mesh sieve for consistency limits test.These limits control the consistency of material as wetting condition change.Liquid limit and plasticity index reduce in a linear manner with increasing of calcium carbonate content(Fig 1).Regression analysis results are as follow:

LL= 84.09-0.84$CaCo_3$ n=36 r=0.81

PI = 61.13-0.79$CaCo_3$ n=36 r=0.84

Slaking degree and slake durability index: Sansaki et al(1981) classified the argillacious rocks into six class from A to F based on the degree of slaking(disintigeration and craking of rocks in contact with water).Rock group 1 set in class F and group 2 in class E&F and group 3 in class B&C.

Slake durability index (ASTM D4644-87) of rock group 2 set in low durability class and rock group 3 in high moderate durability class (based on Gamble's slake durability classification).

Uniaxial compressive strength: With increasing the calcium carbonate content of marly rocks the amount of natural moisture content reduce and consequently uniaxial compressive strength of rock increase.

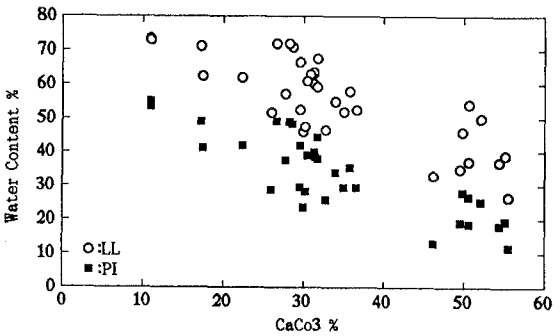


Fig.1:Consistency limits in relation to carbonate content

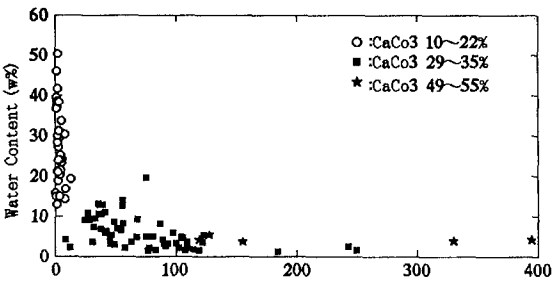


Fig.2:Rrlatonship between qu,w% and CaCo3%

CONCLUSIONS:

Clay/carbonate content and the type of clay mineral are the main factors that control the engineering properties of marly rocks. If the kind of clay mineral be constant ,the engineering properties of these rocks improve with increasing in the calcium carbonate content.

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