VI a 12

OBSERVED SETTLEMENTS

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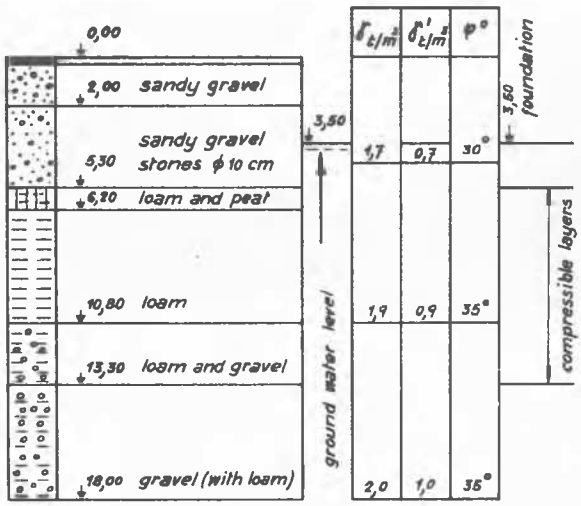
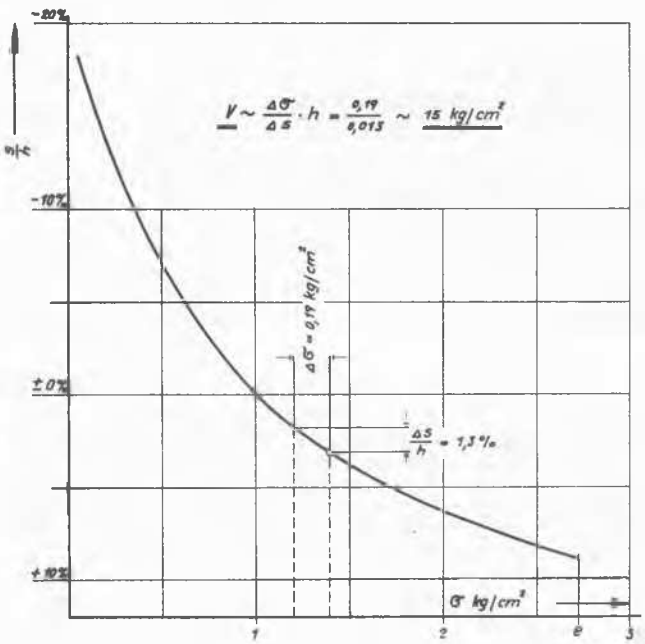
During the war numerous bunkers and concreted refuges had to be built in Switzerland in partly bad soil. Whilst for the bunkers only little settlements could be permitted, the refuges could stand quite considerable settlements, of course always provided that these settlements were regular and not tending to force the refuges in an inclined position.

For the examination of the soil, test-borings of 152 mm diameter have been executed, whereby undisturbed samples were taken and controlled in the laboratory. Due to the fact that from every test-boring in the maximum



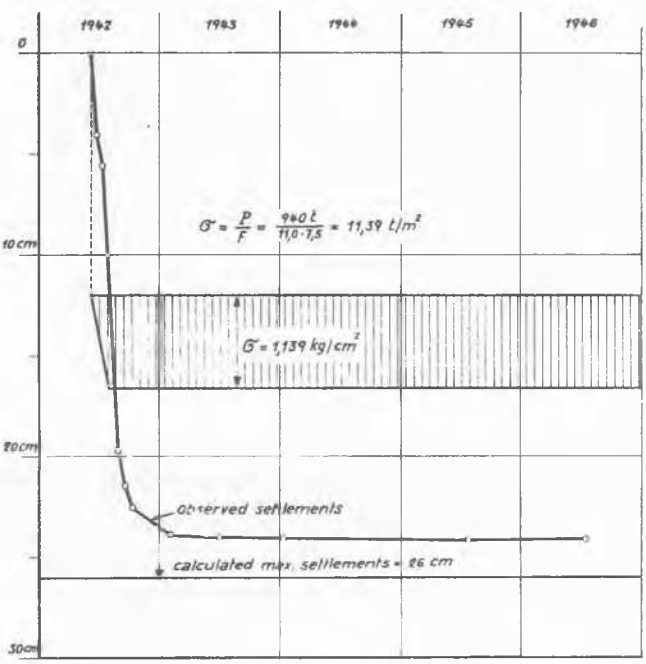
Concreted refuge (shelter) A.

FIG.1



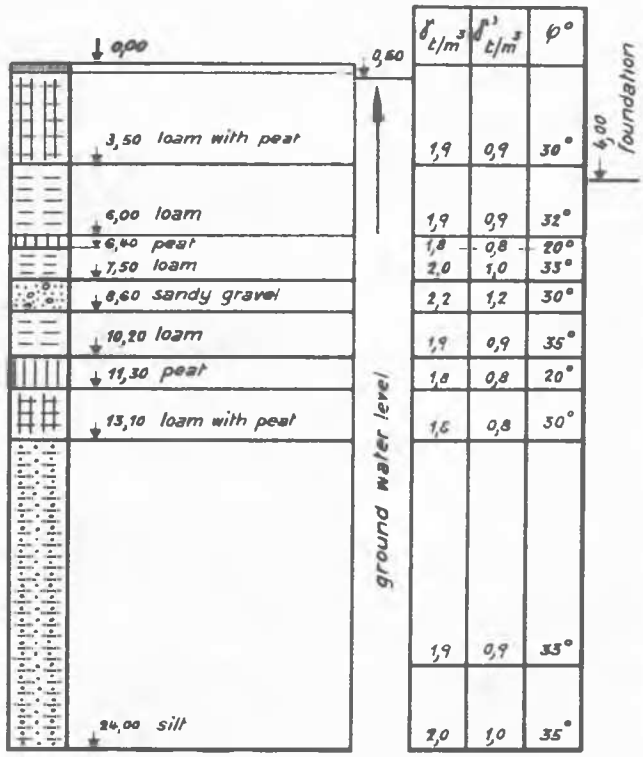
Shelter A. Oedometer - test. Depth 10,20-10,40m.

FIG.2



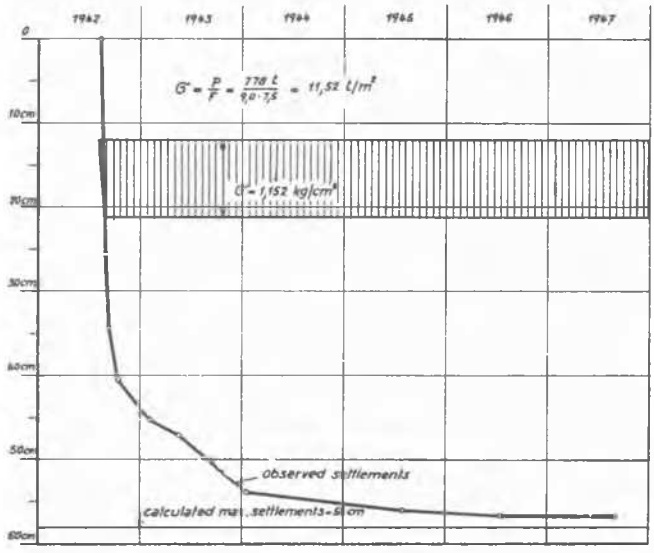
Shelter A.

FIG.3



Shelter B.

FIG.4



Shelter B.

FIG.5

four samples have been examined, the settlements are calculated approximatively according to the theory of Steinbrenner. 1)

For the singular layers the modulus of plasticity V is determined by the aid of the Oedometer tests. This modulus must be found out for the difference between the real soil charge and the charge resulting from the shelter. The maximal settlements can be determined in calculating separately the pressions and the settlements of the singular layers, adding them up afterwards for the total settlement.

Fig. 1 shows the soil profil for refuge A, fig. 2 represents an Oedometer-test for the depth 10,20 - 10,40 m (V = 15 kg/cm2) and fig.3 illustrates the calculated maximal settlements and the observed settlements.

Fig. 4 shows the soil profil for refuge B and fig. 5 the calculated maximal settlements and the observed settlements.

From the fig. 3 and 5 we learn that in all these cases, basing on the approximative theory of Steinbrenner, good results can be obtained.

SUMMARY.

For simple cases (provided that undisturbed samples have been taken and examined in the laboratory) the settlements which may happen can be calculated according to the approximative theory of Steinbrenner in a sufficiently exact way.

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SUB-SECTION VI b

MEASUREMENTS OF STRESS DISTRIBUTION IN THE CONTACT FACE

VI b 1 TESTS FOR THE DETERMINATION OF THE DISTRIBUTION OF SOIL REACTIONS UNDERNEATH BEAMS RESTING ON SOIL

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INTRODUCTION.

To obtain a more exact idea about the law of distribution of soil reactions underneath beams resting on soil, a certain number of tests have been performed in the laboratory on steel beams resting on Rhine sand.

DESCRIPTION OF THE TESTING EQUIPMENT.

As container was used a very rigid box from 2,05 m. x 1,05 m. A view of the box is given on fig. 1, a scheme on fig. 2. The box was placed under a 10 tons press. The soil used is Rhine sand, with the granulometric distribution given on fig. 3.

The sand is put in the box in successive layers of 0,15 m thickness after compaction; the necessary precautions were taken to prevent the disturbance of the structure of a previous layer by introducing new layers. By means of the press and the device indicated on fig. 4, each layer was subjected in each point to a pressure of 2 kg/cm^2. Thus there was a certitude that the soil previous to the tests has been subjected to a pressure of 2 kg/cm^2; for stresses less than this value the settlements don't depend on the constant of compressibility C, but are determined by the constant of expansion A.

The total thickness of the sand in the