A DEVICE FOR TRIAXIAL COMPRESSION TEST OF SAND

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SYNOPSIS

In this paper a special device for triaxial compression test of sandy specimen is introduced which serves to maintain the proper shape of specimen before sufficient lateral pressure is applied thereto.

In triaxial compression test of sand, one of the problems is how to prevent slumping of specimen before applying cell pressure. In the case of dry sand, slumping before test may be prevented by applying a negative pressure on the specimen. However, the use of suction may be undesirable for the test in which the moisture content is held at a constant value. To avoid this difficulty a new apparatus was built. With this device, triaxial compression test of sand can be carried out under a precise condition of assigned moisture content.

Fig. 1. Split Jacket Holder

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This apparatus consists of a split jacket and its holder. Principle of the device is to hold the required shape of specimen with the jacket until cell pressure is raised to the value sufficient to prevent slumping of specimen. Explanation in detail follows.

A rubber sleeve, attached to the pedestal, is held to the required shape of specimen with the split jacket placed outside the rubber sleeve. The jacket consists of two halves, no bolt and nut being used to assemble it. Then the holder is closed and the hook is locked, as shown in Photograph 3. When the hook is unlocked, the holder is forced to open by the plate-spring fixed to the holder shaft as shown in Photograph 1. When the holder is locked, the position of the jacket is correctly located with the stopper as shown in Fig. 1. The jacket and the holder are connected to each other with rubber band as shown in Photograph 2. Sand is then spooned into the sleeve

Photograph 1. Jacket Holder

Photograph 2. Split Jacket Connected to the Holder

Photograph 3. Placing of Sample

Photograph 4. Whole Assembly of the Pressure Cell

as shown in Photograph 3. Initial void ratio of sample may be controlled by tamping during placing. On the completion of sample placing, the top filter metal is attached to the rubber sleeve with a rubber band. Then the whole triaxial machine is assembled, and the fluid is filled in the cell.

As the results of trials, the minimum value of cell pressure necessary to prevent slumping is found to be about 0.2 kg./cm.², even for dry sand. Therefore, the application of cell pressure is made in two steps. When cell pressure is raised to 0.2 kg./cm.², the cock valve connecting cell and compressed-air tank is closed. And another valve cock connecting air tank and the piston fixed to the holder is opened. Then a pressure higher than 0.2 kg./cm.² is applied to the piston and causes the hook to unlock. As the holder is unlocked, each arm of it, together with the corresponding half of the jacket, moves apart correctly by virtue of the stopper as shown in Photograph 4. A rubber cushion is provided on each arm of the holder to protect the cell wall when

Fig. 2. An Example of Test Results

the arms hit it. After the jacket is removed, the valve connected to the piston is closed, and cell pressure is raised to the assigned value, then straining is begun.

With this apparatus, slumping of specimen before test is found to be virtually prevented. This apparatus would be applicable for soft clay sample. Fig. 2 shows an example of test results on dry sand carried out with this apparatus.