

CORRESPONDENCE

The Secretary,
The Institution of Civil Engineers.

DEAR SIR,

In the article entitled " A Constant-Pressure Control for the Triaxial-Compression Test " (*Géotechnique*, III : 8 : 339) by Dr Bishop and Mr Henkel, a brief mention was made of a method of control in which a commercial diaphragm valve was used to obtain a supply of air at constant pressure from a compressed-air cylinder. This method was evidently tried by the authors but was rejected on account of the rapid pressure fluctuation observed.

The mercury control device described in detail in this article was described briefly in an earlier article by Drs Skempton and Bishop (*Géotechnique*, II : 2 : 90). From the description in the first of these two articles, a control of this type was constructed in the Department of Municipal Engineering, College of Technology, Manchester, for use in consolidated—quick and slow triaxial-compression tests.

Three different types of cell were used for these tests : two commercial cells and another made in the workshops of the college. In each case it was found impossible to eliminate leakage where the plunger entered the cell—without introducing an undue amount of friction at this bearing. The capacity of this mercury control device was slightly greater than that of the one for which details were given in the article by Dr Bishop and Mr Henkel. In spite of this, it was found that, on account of the leakage at the plunger bearing, the apparatus needed attention at frequent intervals if constant pressure were to be maintained. Where this leakage can be eliminated, I believe that the mercury control device is the best available, but those who have experienced this leakage difficulty may be interested to hear about the compressed-air regulator-valve type of control which is now used.

In our original apparatus, a supply of air at constant pressure was obtained from a large compressed air cylinder via a two stage pressure regulator. This regulator was obtained from a firm of welding equipment specialists. Even with a fairly large amount of leakage, this equipment was found to be capable of maintaining the supply of air for the duration of slow triaxial-compression tests.

In its latest form, developed by a former research student in the above-mentioned department, Mr D. Fielding, the apparatus makes use of two extra regulator valves, and three cells can be supplied simultaneously from a single compressed-air cylinder. Each cell can have a different pressure or the pressure in all three can be the same. An air compressor (a second-hand refrigerator compressor) is connected to the compressed-air cylinder and, when the pressure in this cylinder has fallen to about 140 lb. per square inch, a switch controlled by the pressure in the cylinder operates automatically and starts the compressor motor. When the pressure in the cylinder has risen to about 200 lb. per square inch, the switch operates again, stopping the motor. This pressure control device has been in use for several months now and appears to be capable of operating indefinitely without attention.

With regard to the fluctuation in pressure which is inevitable with this type of regulator valve, tests made by Mr Fielding showed that in the steady conditions prevailing in the slow triaxial-compression test, the range of variation was about $\frac{1}{4}$ lb. per square inch.

Yours faithfully,

E. SPENCER