Determination of Size of Footings*

Discussion *By* K. Kurma Rao*

The procedure for calculating the width of shallow foundations based on the bearing capacity and settlement criteria was presented by N.S. Pandian *et al* (1993). The paper is interesting. However it suffers from a few limitations as given below.

1. It is assumed that the footing directly rests on clay or clayey sandy stratum. Footings, in practice will never be laid directly on expansive or non-expansive clay stratum. At least a 30 cm to 50 cm well compacted sand cushion is laid in between the footing and clay stratum. In all such circumstances, the design charts will not be of use.

2. Soils with $\phi = 30°$ and $c = 15.0$ t/m² will only exist theoretically (Fig. 4).

3. In page 255, it is assumed that the water table exists far below the footing level. In such a condition, Eq. (12) which is meant for fully saturated soils does not apply.

4. In the nomenclature listed, the symbols like C, r, X and μ were not referred in the main paper, even though this is not a serious omission.

5. If non-dimensionalised design charts are drawn taking into appropriate sand cushion between footing and clay stratum, the paper would have been more useful.

6. Eq. (13) represents for finding out the stress under the corner of a uniformly loaded rectangular area. To get the maximum stress, Eq. (13) would be multiplied by 4 since maximum stress occurs at the centre of a rectangular footing. Whether Eq. (13) was multiplied for 4 in the various calculations or not is not mentioned in the paper.

Reply to discussion by K. Kurma Rao on paper entitled "Determination of Size of Footings"

The authors thank Kurma Rao for his critical comments.

(1) Most of the available analyses assume the footings to rest directly on the foundation soil. The authors do not agree with the statement of the discussor "Footings in practice will *never be laid on* expansive or *non-expansive* clay stratum". Further, with the sand cushions, using the charts will result in conservative values only.

(2) The combination $\phi = 30°$ and $c = 15t/m^2$ is given as an extreme case. It may be mentioned, in most of the analyses, the numerical values are assumed so as to represent extreme values also in addition to the normal values.

(3) It is to be stated that the soil above water table can also be in a fully saturated condition.

(4) The error is regretted.

(5) The stresses were calculated properly.