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7707 DISCUSSION

The analysis of flexible bulkheads in sands

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The Authors refer, as others have done, to the fact that the use of the UK Code of Practice[8] leads, in the design of flexible walls, to heavier walls than would result from the use of other codes. They indicate that their results are in close agreement with Rowe's model test data and from this premise they suggest that further weight will be given to arguments for an early revision of the UK code. In fact the time for debate is long past as to whether or not it should be revised. Let me assure them, as Chairman of the present CP2 Committee, that the code is under active revision.

62. It is not my prerogative to say whether or not design methods of the type advocated by Rowe should form a permissible basis for design under a revised code, but what is surely needed is a close co-operation between academics, research workers and practising engineers, in order to develop methods of design which can be applied to conditions in practice. However, I think one should avoid that state of mind which looks to codes to guarantee that a particular form of construction will be free from imperfections. As a design philosophy I believe a code should steer a middle course between complaints by designers that the code is too conservative and worries by the builder that there are no margins allowed to overcome practical problems on site. Although there is probably a strong argument that the old code was too conservative, it is not the function of a competent civil engineer to skin down the size of a structure until it differs by not more than the thickness of a gnat's whisker from the theoretical requirements.

63. It may be a surprise but some people have difficulty in visualizing how the ideal soils used in mathematical analysis and the carefully controlled materials used in laboratory tests are related to the actual materials which from time to time have to be supported in practice. However, no doubt those who have difficulty will find in due course that all will be revealed, if only those who carry out the advanced analysis and research work will explain how it is that, because certain mathematical analyses and laboratory tests agree, this proves that they are the right tools for actual design and then show how they can be used.

Dr Smith and Mr Boorman

As one of us is an academic and the other is a practising engineer, it might be thought that the Paper itself serves as an example of the co-operation needed between various branches of the profession.

65. The difficulty experienced by many in appreciating the mathematical analysis comes as no surprise. Mathematics is irrelevant to the actual materials which have to be supported in practice, and to them, Rankine's theory is as far from reality as a finite element idealization. However, an encouraging number of engineers are willing to make the effort to understand how to implement modern computer-based methods.

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