

DISCUSSION

O F E R E C E  
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Just to liven this up, to some extent I would agree of course with Prof. Kenney, and Prof. Schiffman, but I would like to emphasize that we are really not so very much concerned with the pressures except in as far as they are a means to an end. An engineer builds a form and he is concerned with what causes it to deform. So we are really more concerned with deformation: we only go to the stress because of first degree approximations and the stress-deformation relationship since stress is the easiest and the principal factor affecting deformation. Now, in horizontal movements, I would say from experience recently in the São Paulo and Rio de Janeiro subways, that on the one hand we are really unable to predict, but on the other hand it seems to me that the deformations are much smaller than we have feared they would be.

Nevertheless, I should emphasize that with respect to the importance of vertical versus horizontal movements of the buildings near these 25m cuts or even over shield tunnelling - the vertical movements have caused much less damage to buildings than horizontal movements of let's say, one third of the magnitude. So it seems as though structures are "accustomed", to moving vertically downward. The greatest damages are done either by movements laterally or even worse by moving upward. Some grouting contractors insisted with us, that they would be able to (1) "solidify" soil, sorry to use these terms of obvious commercial flavour as they tend to be used in non-engineering and (2) if we were at all afraid of any settlement, they would also be able to cause an upward movement of the building at the beginning in order to compensate the downward movement that would later take place.

Which shows you how absurd a pseudo engineering proposition can be, where one doesn't realize what you really want.