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COMPUTER AIDED LIMIT ANALYSIS IN COHESIVE SOILS

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The determination of conditions at failure is an important aspect in the analysis of many problems in soil mechanics and foundation engineering. Even with the recently developed techniques like finite element method, the exact or near exact solutions for such problems are difficult to obtain except in a few cases of simple geometry and uniform soil conditions.

Alternatively, the limit theorems of plasticity can be used to find upper and lower bounds for the exact solution in cases where the pre-collapse deformations are not substantial. The use of some techniques for obtaining such bounds are illustrated here through a trial problem on the stability of a near surface rectangular plane section tunnel.

These analyses were made by computer programs using a simple optimisation procedure. Even though good lower bounds were difficult to obtain, the analyses bracketed the exact answer to within $\pm 10\%$ for many tunnel shapes and overburden thickness, illustrating the effectiveness of the techniques. The optimum upper bound mechanism also indicated how the load transfer took place and how it varied with the geometry of the problem.