

# **Comparism of Computer Based Yield Line Theory with Elastic Theory and Finite Element Methods for Solid Slabs**

**J.O. Akinyele**

## **Abstract**

The complexity and conservative nature of the Yield Line Theory and its being an upper bound theory have made many design engineers to jettison the use of the analytical method in the analysis of slabs. Before now, the method has basically been a manual or hand method which some engineers did not see a need for its use since there are many computer based packages in the analysis and design of slabs and other civil engineering structures. This paper presents a computer program that has adopted the yield line theory in the analysis of solid slabs. Two rectangular slabs of the same depth but different dimensions were investigated. The Yield Line Theory was compared with two other analytical methods namely, Finite Element Method and Elastic Theory Method. The results obtained for a two-way spanning slab showed that the yield line theory is truly conservative, but increasing the result by 25% caused the moment obtained to be very close to the results of the other two methods. Although it was still conservative, the check for deflections showed that it is reliable and economical in terms of reinforcement provision. For a one way spanning slab the results without any increment falls in between the two other methods with the Elastic method giving a conservative results. The paper concludes that the introduction of a computer-based yield line theory program will make the analytical method acceptable to design engineers in the developing countries of the world.

**Keywords** Analytical method ; Moments ; Solid slabs ; Yield line theory

---