NONLINEAR ANALYSIS OF REINFORCED

CONCRETE BEAM : A Case Study

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ABSTRACT

A number of material-related factors can cause stiffness of structure to change during the course of analysis. Nonlinear stress-strain relationship of plastic will cause a structure stiffness to change at different load levels.

In this study, the nonlinear finite element analysis of a reinforced concrete beam using ANSYS (Swanson Analysis System), a finite element analysis system is presented ANSYS element was utilised to model the beam in three dimension (3D) were adopted in the analysis, Two case of support conditions were adopted in the analysis, i.e. firstly considering no anchorages and secondly with proper anchorage at the end joints. Crack propagation was also studied on the beam.

1.0   INTRODUCTION

1.1   General

The search for a way to represent the true nonlinearity of structure goes back to renaissance times, and present theories of nonlinear elastic and inelastic behaviour are the result of approximately two hundred years of steady development. But only recently has computer made it possible to put much knowledge to use in design.

The finite element method, simulated by rapid growing power of electronic digital computers, has strengthened its position in computer in computational mechanic from its early stage of performing linear analysis for simple problem into an era of conducting the more challenging tasks, such as nonlinear, inelastic dynamic analyses and so on, for problem that are ten, hundred, or thousand times more complicated than those ever attempted before. Nowadays, many people tend to view the finite element method as a well-established tool that can be readily applied to the solution of various nonlinear problems. Experience has shown us that can be too optimistic in many cases , as the various phases involved in a nonlinear analysis are not as definite and straightforward as those of linear analysis.(Yang, Yeong -Bin, 1954).